

Table F-1. USGS stream gages upstream and downstream of Willamette Project facilities, and dam completion dates.

Gage Number	Name	Peak-Flow Analysis Period of Record		Monthly Flow Analysis Period of Record		Dam(s)	Completion Date	Dam(s)	Completion Date	Dam(s)	Completion Date
		Pre-Dam	Post-Dam	Pre-Dam	Post-Dam						
14144800	Middle Fork Willamette River Nr Oakridge Or	1959-1987 ¹		1959-1960 ³	1962-1997 ³	Hills Creek	1961				
14145500	M Fork Willamette River Ab Salt Cr, Nr Oakridge, Or	1914-1960 ¹	1963-1998 ³	1914-1960 ²	1962-1987 ²	Hills Creek	1961				
14148000	Middle Fork Willamette R BI N Fork, Nr Oakridge, Or	1912-1960 ¹	1962-1998 ³	1912-1960 ²	1962-1987 ²	Hills Creek	1961				
14150000	Middle Fork Willamette River Nr Dexter, Or		1955-1998 ³	1946-1952 ²	1962-1987 ²	Lookout Point	1954				
14150300	Fall Cr. Nr Lowell, Or	1963-1987 ¹		1963-1987 ²		Fall Creek	1965				
14151000	Fall Creek BI Winberry Cr Nr Fall Cr,Or	1936-1965 ³	1967-1998 ³	1936-1965 ²	1967-1987 ²	Fall Creek	1965				
14152000	Mf Willamette River at Jasper, Or		1968-1998 ³	1905-1912 ³ , 1913-1917	1967-1987 ³	Lookout Point	1954	Fall Creek	1965		
14152500	Coast Fork Willamette River at London,Or	1936-1987 ¹		1936-1941 ³	1943-1986 ³	Cottage Grove	1942				
14153500	Coast Fork Willamette River BI Cottage Grove Dam,Or		1943-1998 ³	1939-1941 ³	1943-1998 ³	Cottage Grove	1942				
14154500	Row River Ab Pitcher Creek Nr Dorena, Or	1936-1987 ¹		1936-1948 ³	1950-1998 ³	Dorena	1949				
14155500	Row River Nr Cottage Grove, Or	1939-1949 ¹	1950-1998 ³	1939-1948 ³	1950-1997 ³	Dorena	1949				
14157500	Coast Fork Willamette River Nr Goshen, Or		1950-1998 ³	1906-1912 ³	1951-1987 ³	Cottage Grove	1942	Dorena	1949		
14158000	Willamette River at Springfield, Or	1912-1942 ¹		1912-1913 ³ , 1920-1941	1954-1957 ³	Cottage Grove	1942	Dorena	1949	Lookout Point	1954
14158850	McKenzie River BI Trail Br Dam Nr Belknap Sprgs,Or		1964-1998 ³			Carmen/ Cougar	1963				
14159000	McKenzie River at McKenzie Bridge,Or	1911-1964 ¹	1966-1994 ³	1911-1962 ²	1964-1987 ²	Carmen/ Cougar	1963				
14159200	South Fork McKenzie River Ab Cougar Lake,Or	1959-1987 ¹		1958-1962 ³	1964-1987 ³	Cougar	1963				
14159500	South Fork McKenzie River Nr Rainbow,Or	1946-1952 ¹	1965-1998 ³	1948-1962 ²	1964-1987 ²	Cougar	1963				

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Gage Number	Name	Peak-Flow Analysis Period of Record		Monthly Flow Analysis Period of Record		Dam(s)	Completion Date	Dam(s)	Completion Date	Dam(s)	Completion Date
		Pre-Dam	Post-Dam	Pre-Dam	Post-Dam						
14161100	Blue River Bl Tidbits Cr Nr Blue River, Or	1964-1987 ¹		1964-1987 ²		Blue River	1968				
14161500	Lookout Creek Nr Blue R Or	1950-1987 ¹		1950-1987 ²		Blue River	1968				
14162000	Blue River Nr Blue River, Or	1936-1964 ¹		1936-1964 ²		Blue River	1968				
14162200	Blue River at Blue River Or		1970-1998 ³		1969-1987 ²	Blue River	1968				
14162500	McKenzie River Nr Vida Or	1923-1962 ¹	1970-1998 ³	1925-1962 ²	1969-1987 ²	Carmen/ Cougar	1963	Blue River	1968		
14165500	McKenzie River Nr Coburg, Or	1945-1962 ¹		1945-1962 ³	1968-1972 ³	Carmen/ Cougar	1963	Blue River	1968		
14166000	Willamette River At Harrisburg Or		1970-1998 ³	1945-1952 ³	1969-1998 ³	Lookout Point	1954	Carmen/ Cougar	1963		
14166500	Long Tom River Nr Noti, Or	1936-1987 ¹		1936-1940 ³	1942-1998 ³	Fern Ridge	1941				
14169000	Long Tom River Nr Alvadore, Or		1942-1998 ³		1961-1985 ²	Fern Ridge	1941				
14170000	Long Tom River at Monroe, Or	1922-1940 ¹	1942-1998 ³	1922-1940 ²	1942-1987 ²	Fern Ridge	1941				
14174000	Willamette River at Albany, Or	1862-1942 ¹	1971-1998 ³	1894-1941 ²	1969-1987 ²	Long Tom/Coast Fk	1941-49	Lookout Point	1954	McKenzie/ Fall Cr	1963-68
14178000	North Santiam River Bl Boulder Cr, Nr Detroit, Or	1907-1987 ¹		1907-1987 ²		Detroit	1953				
14179000	Breitenbrush River Ab French Cr, Nr Detroit, Or	1932-1987 ¹		1932-1987 ²		Detroit	1953				
14181500	North Santiam River at Niagara, Or	1909-1952 ¹	1955-1998 ³	1912-1952 ²	1954-1987 ²	Detroit	1953				
14183000	North Santiam River at Mahama, Or	1906-1952 ¹	1954-1997 ³	1906-1952 ²	1954-1987 ²	Detroit	1953				
14185000	South Santiam River Bl Cascadia, Or	1936-1987 ¹				Foster/Green Peter	1966				
14185800	Middle Santiam River Nr Cascadia, Or	1964-1981 ¹				Foster/Green Peter	1966				

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Gage Number	Name	Peak-Flow Analysis Period of Record		Monthly Flow Analysis Period of Record		Dam(s)	Completion Date	Dam(s)	Completion Date	Dam(s)	Completion Date
		Pre-Dam	Post-Dam	Pre-Dam	Post-Dam						
14187000	Wiley Creek Nr Foster, Or	1948-1972 ¹				Foster/Green Peter	1966				
14187200	South Santiam River Nr Foster, Or		1974-1998 ¹			Foster/Green Peter	1966				
14187500	South Santiam River at Waterloo, Or	1906-1965 ¹	1967-1998 ³	1906-1965 ²	1967-1987 ²	Foster/Green Peter	1966				
14186700	Santiam River at Jefferson, Or	1908-1953 ¹	1967-1998 ³	1908-1953 ²	1967-1987 ²	Detroit	1953	Foster/ Green Peter	1966		
14191000	Willamette River at Salem, Or	1862-1941 ¹	1970-1998 ³	1910-1941 ²	1967-1987 ²	LT/CFW/ MFW/NS ⁴	1941-54	McK/FC/SS ⁴	1963-68		

¹ Wellman et al. 1993² Moffatt et al. 1990³ Calculated using USGS data⁴ FC = Fall Creek; CFW = Coast Fork Willamette; LT = Long Tom; MFW = Middle Fork Willamette; McK = McKenzie; NS = North Santiam; SS = South Santiam

Appendix F-Hydrology Graphs

Estimated Flood Frequency Relationships:

Flood frequency relationships were estimated for USGS gages before and after dam construction using values reported in Wellman et al. 1990 or using the computer program HEC-FFA to perform flood frequency analyses. The input data to HEC-FFA were based on USGS annual peak flow data.. Data for the year of dam construction were not included in the analysis.

Estimated Average Monthly Flows:

Average monthly flows were estimated for USGS gages before and after dam construction using data reported in Moffatt et al. 1990 or using USGS daily streamflow data. Data for the year of dam construction were not included in the analysis.

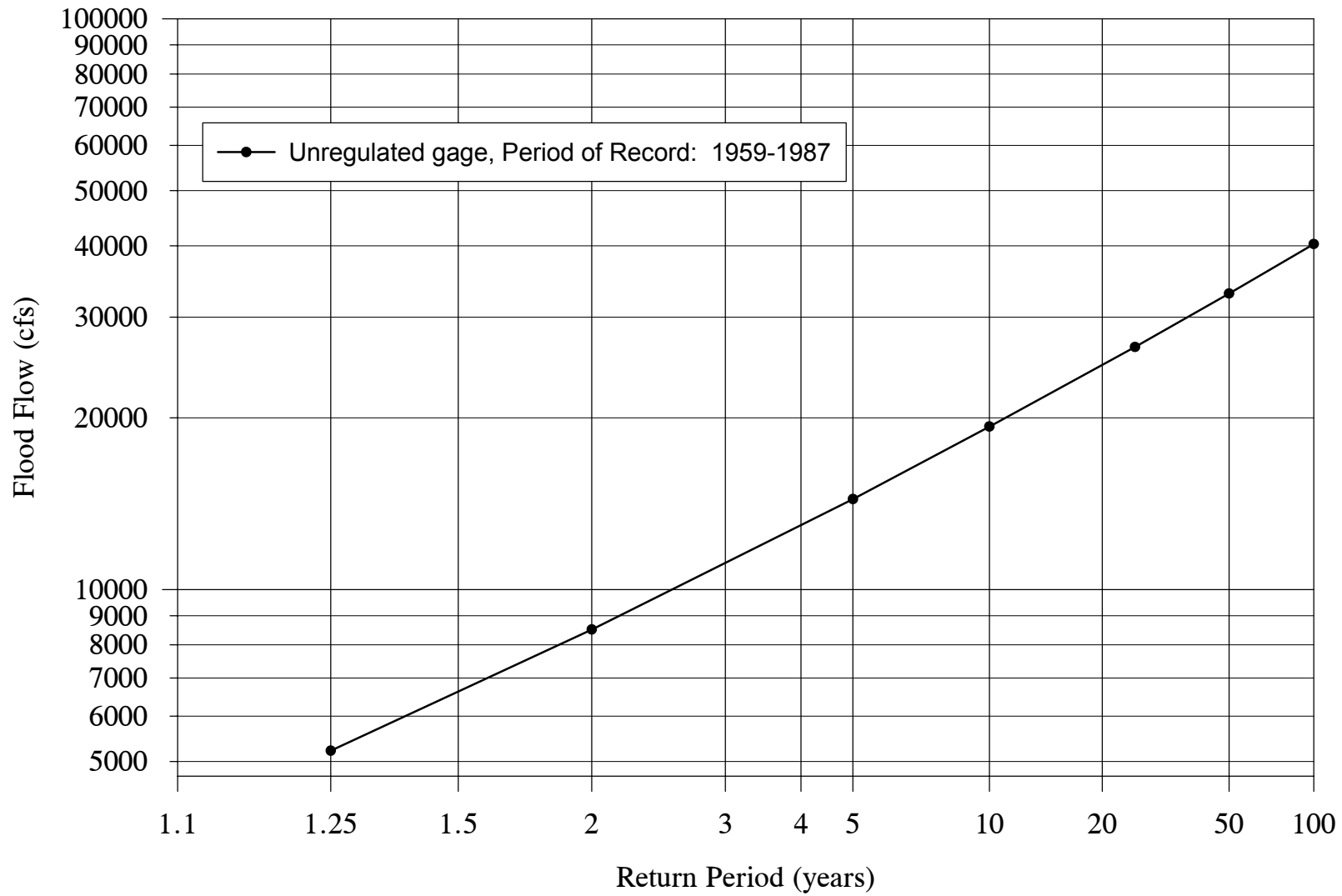


Figure F-1. Estimated flood frequency relationship for USGA Gage No. 14144800 Middle Fork Willamette River near Oakridge, Oregon.

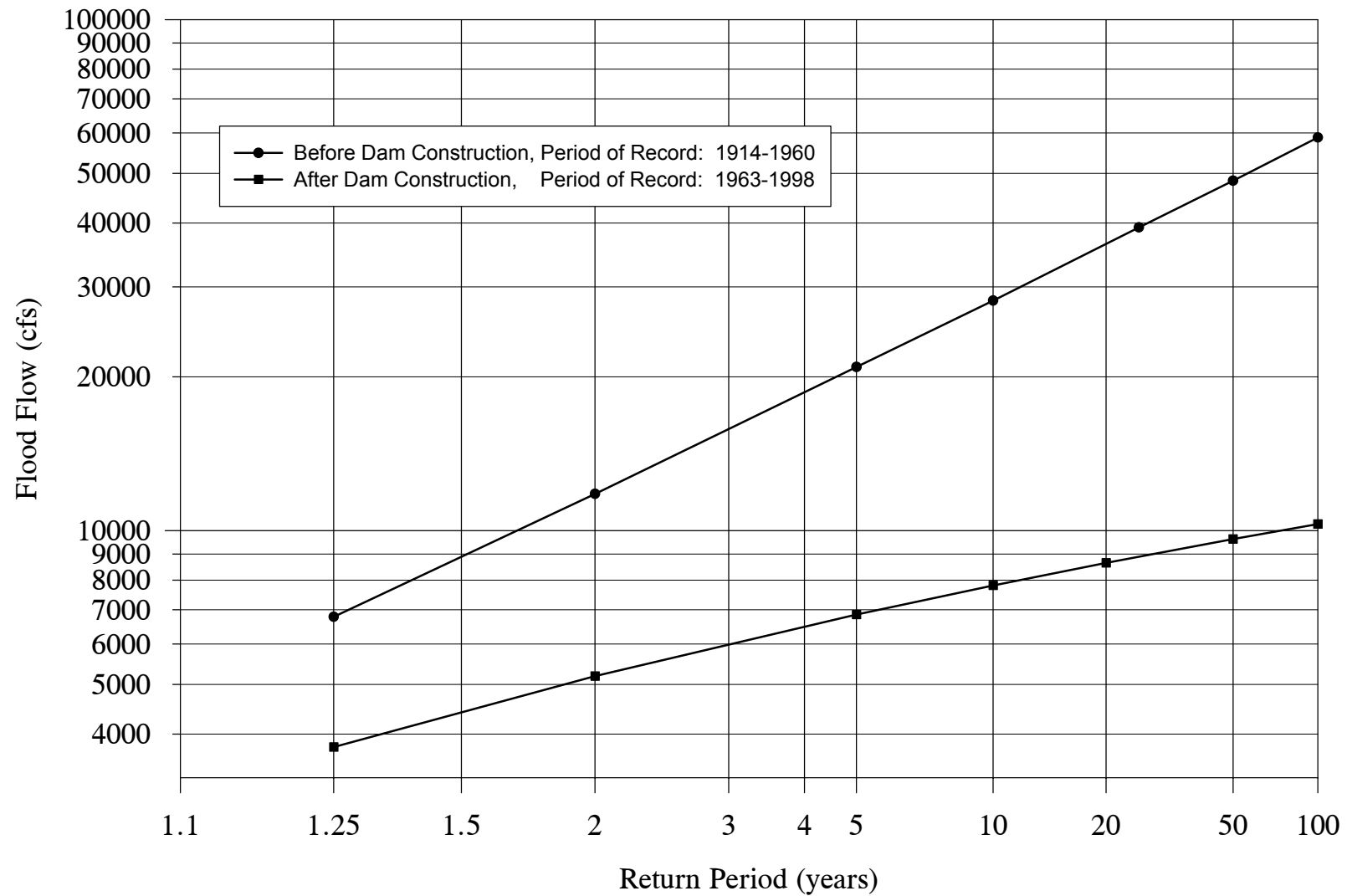


Figure F-2. Estimated flood-frequency relationship for USGS Gage No. 14145500 Middle Fork Willamette River above Salt Creek near Oakridge, Oregon.

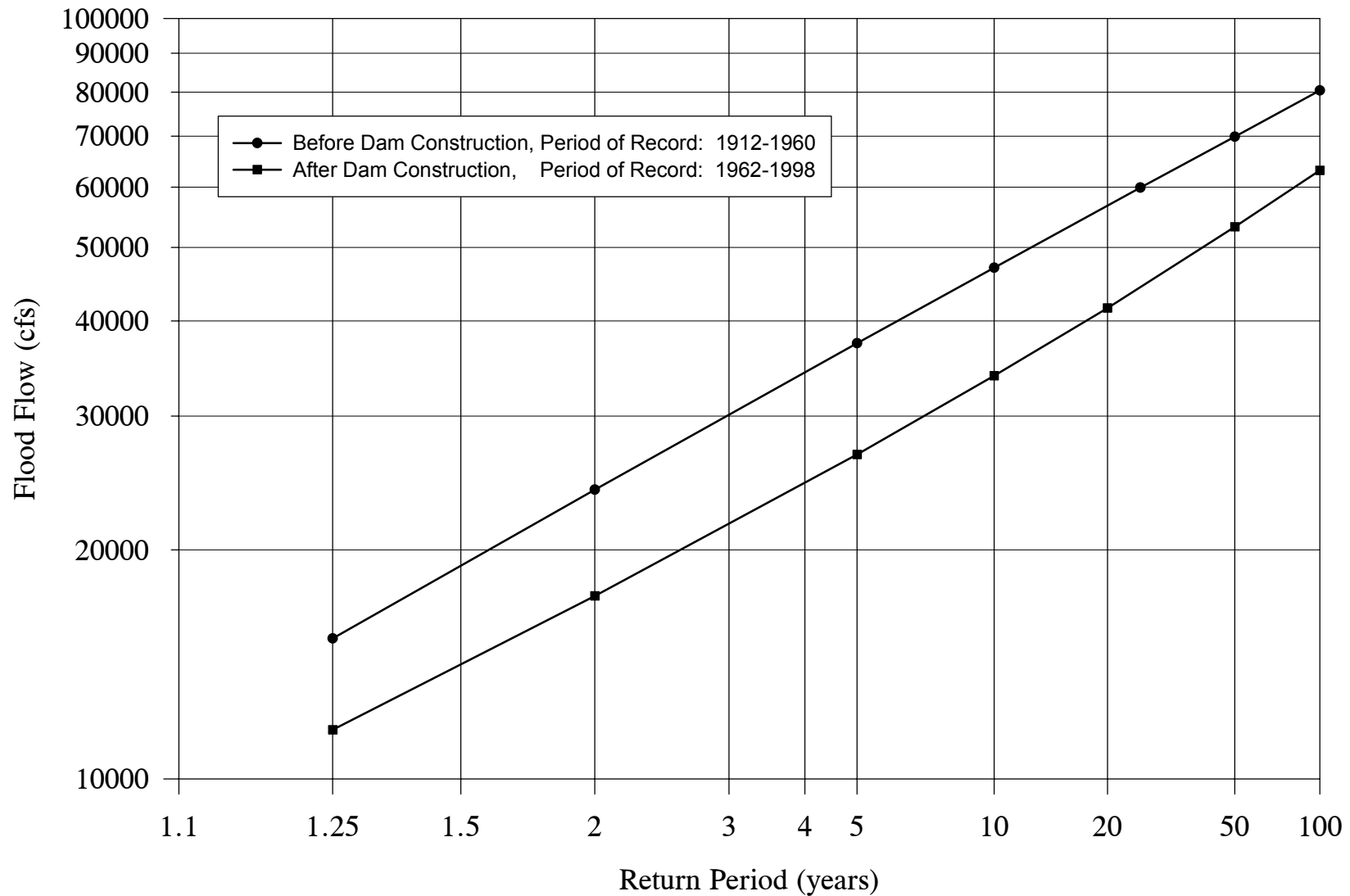


Figure F-3. Estimated flood-frequency relationship for USGS Gage No. 14148000 Middle Fork Willamette River below North Fork near Oakridge, Oregon.

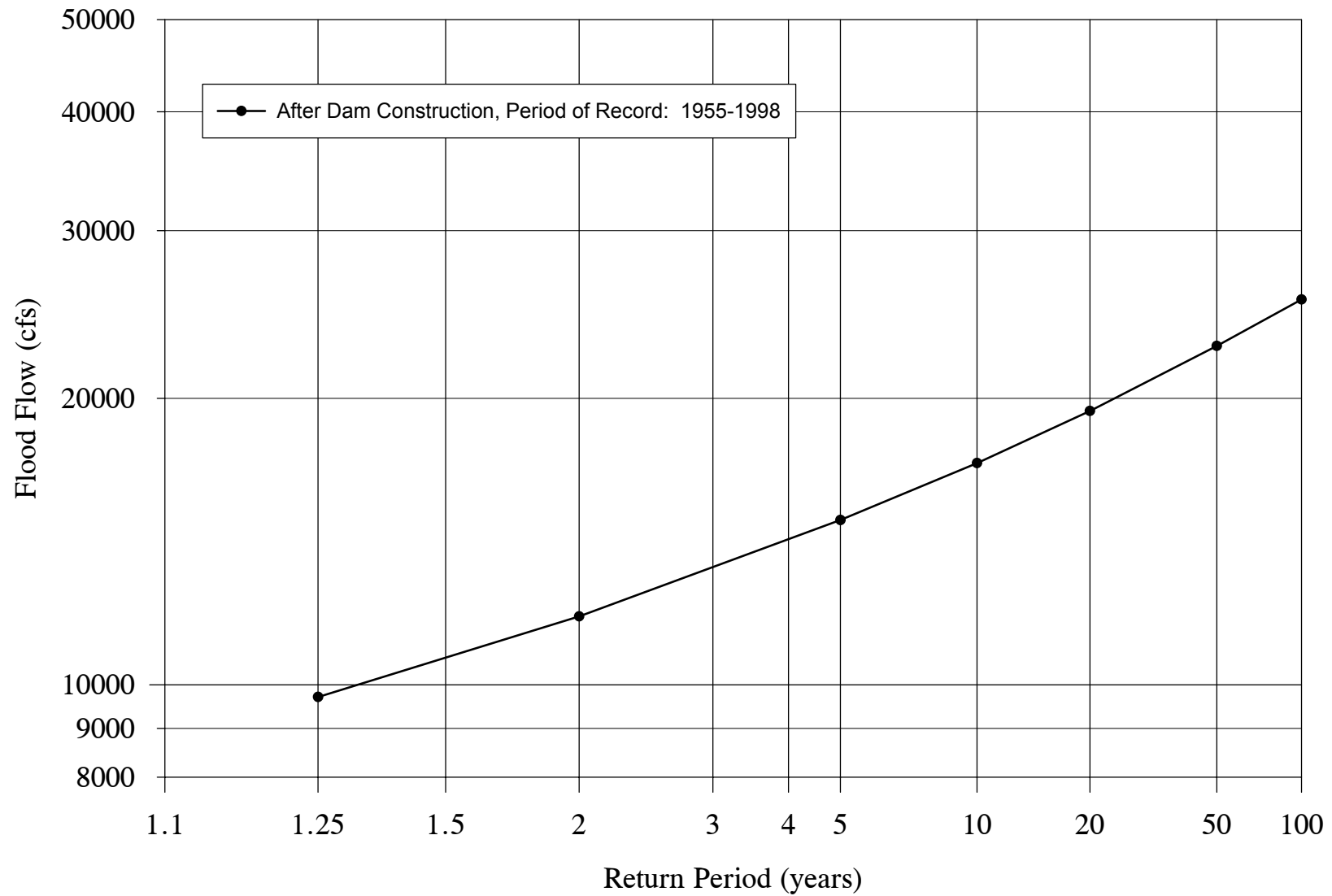


Figure F-4. Estimated flood-frequency relationship for USGS Gage No. 14150000 Middle Fork Willamette River near Dexter, Oregon.

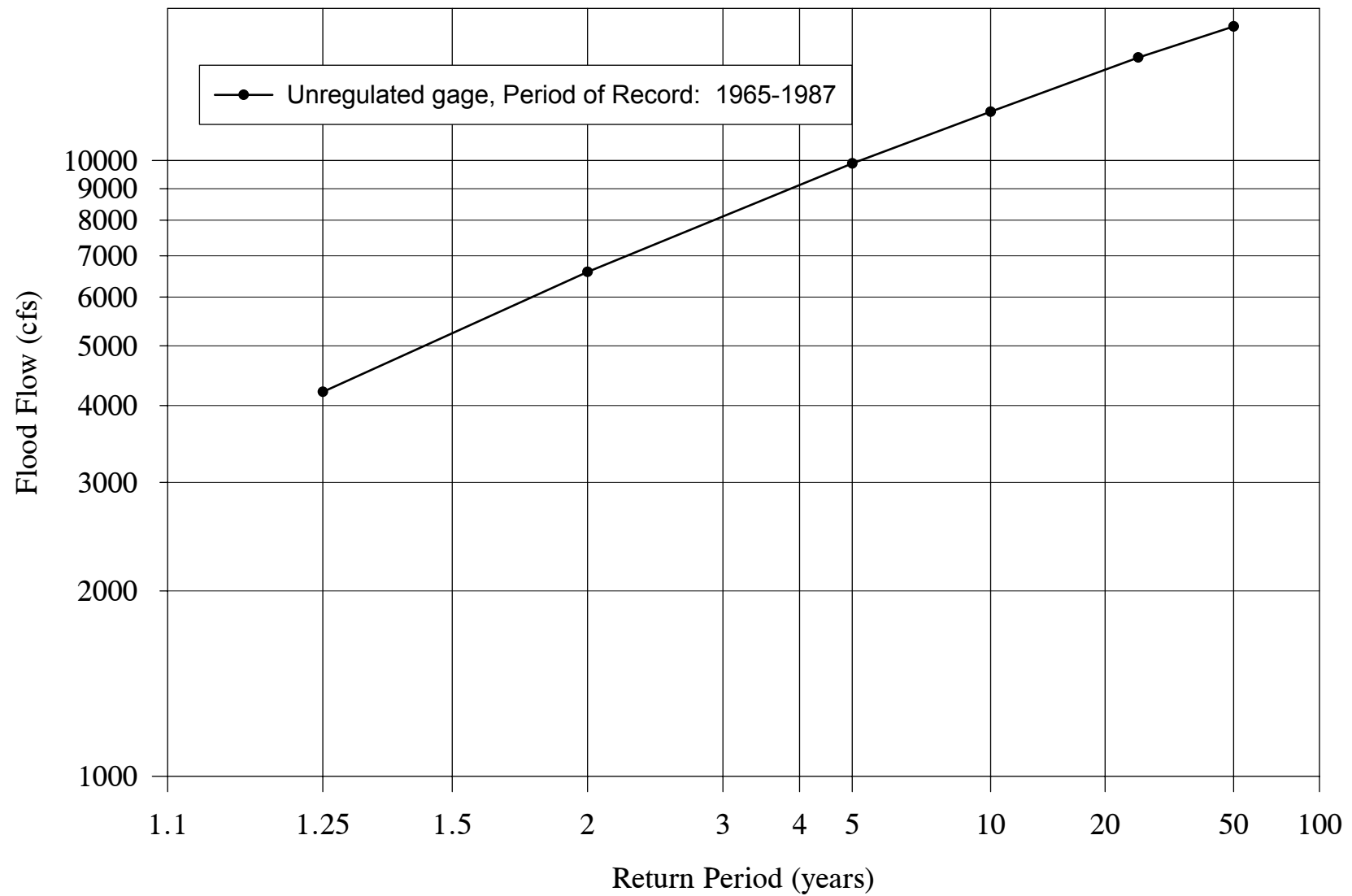


Figure F-5. Estimated flood-frequency relationship for USGS Gage No. 14150300 Fall Creek near Lowell, Oregon.

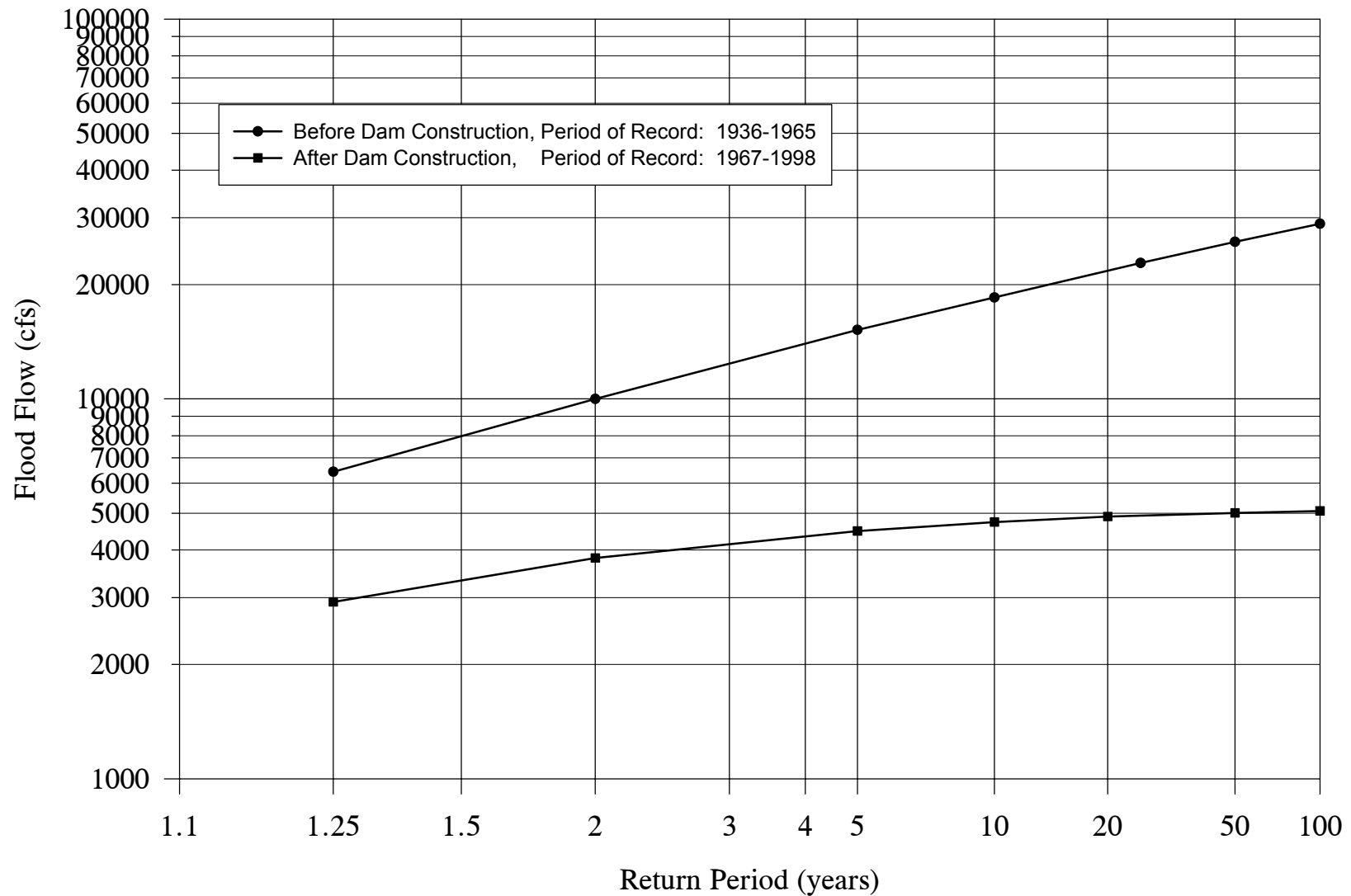


Figure F-6. Estimated flood-frequency relationship for USGS Gage No. 14151000 Fall Creek below Winberry Creek near Fall Creek, Oregon

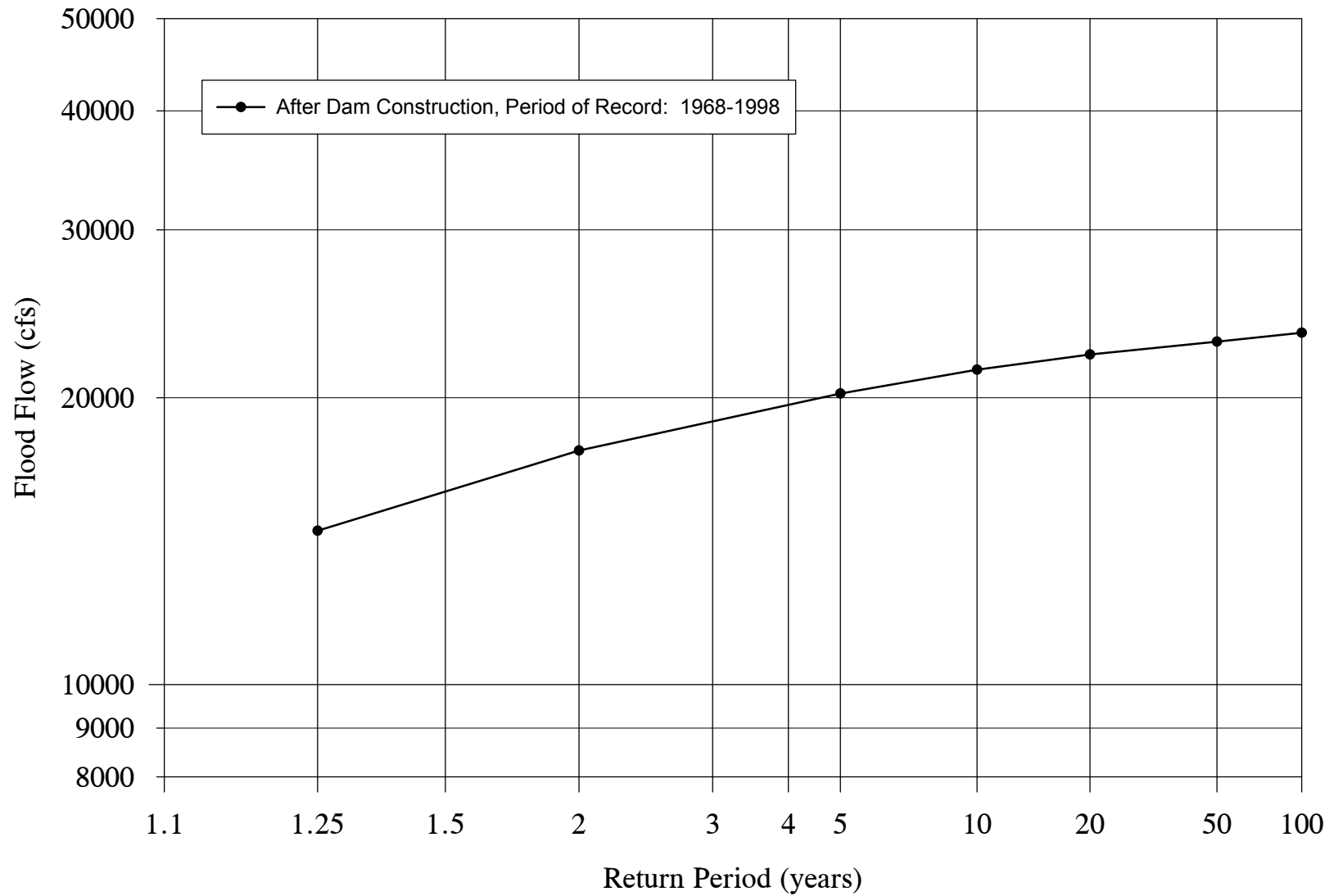


Figure F-7. Estimated flood-frequency relationship for USGS Gage No. 14152000 Middle Fork Willamette River at Jasper, Oregon.

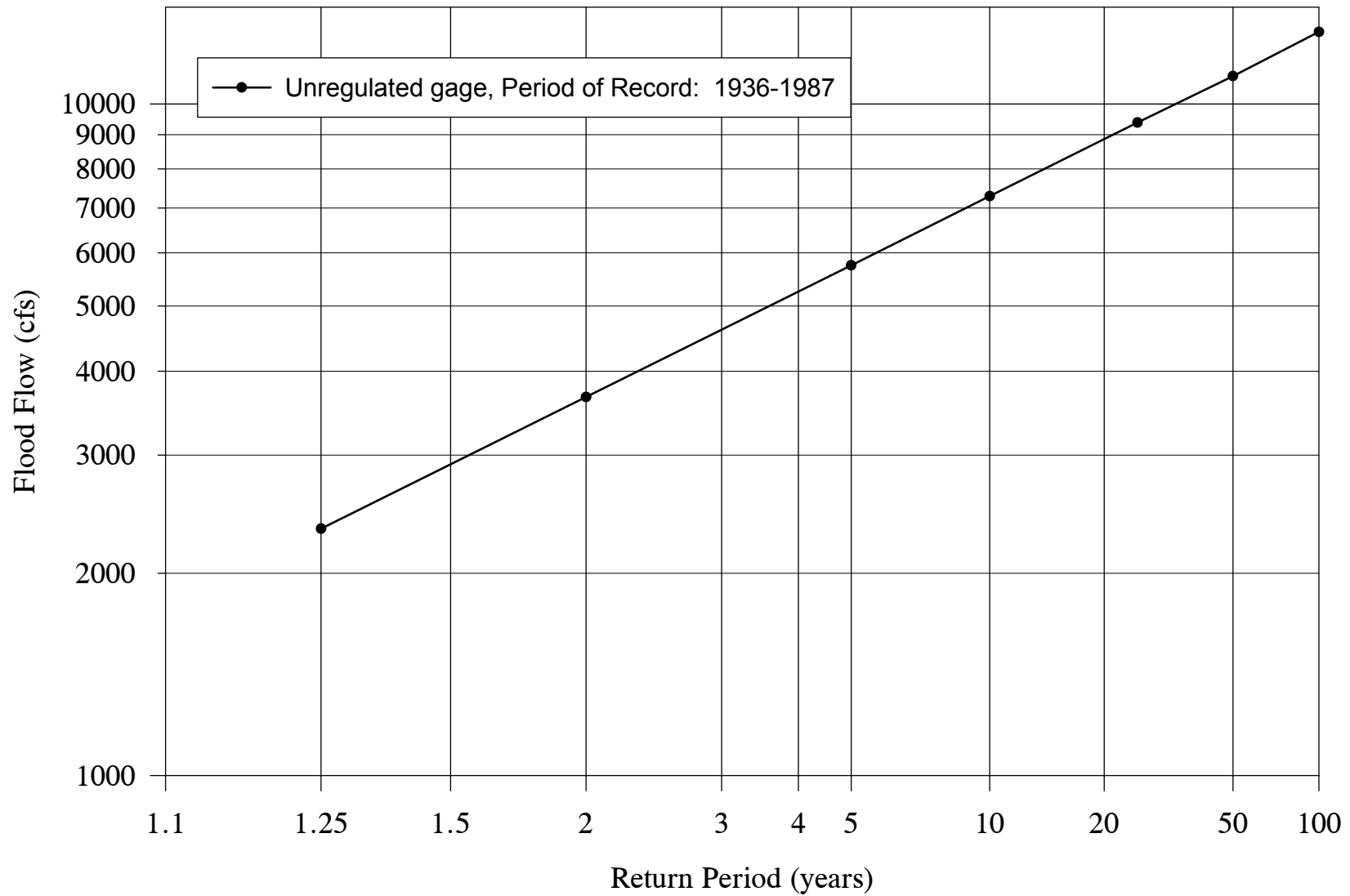


Figure F-8. Estimated flood-frequency relationship for USGS Gage No. 14152500 Coast Fork Willamette River at London, Oregon.

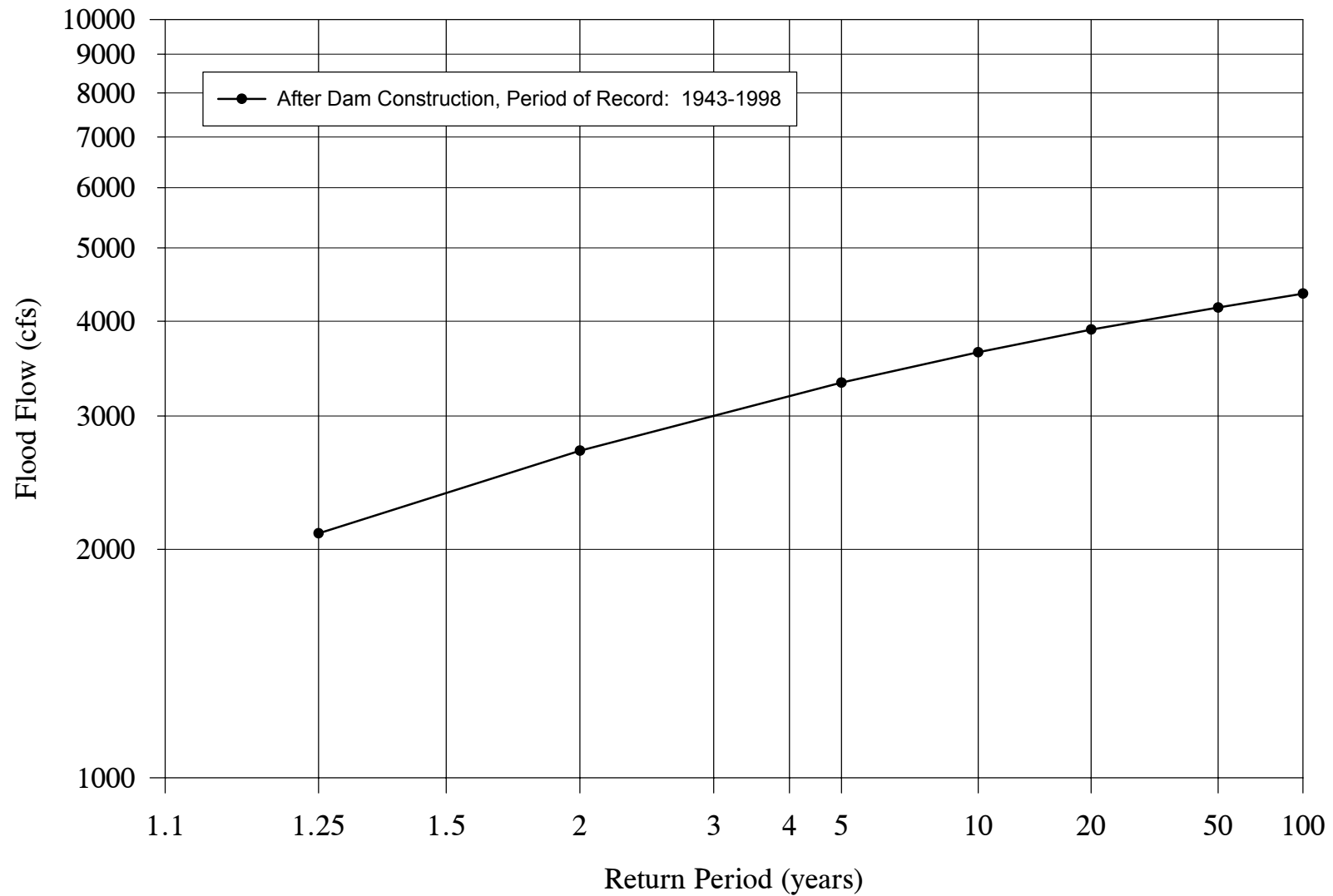


Figure F-9. Estimated flood-frequency relationship for USGS Gage No. 14153500 Coast Fork Willamette River below Cottage Grove Dam, Oregon.

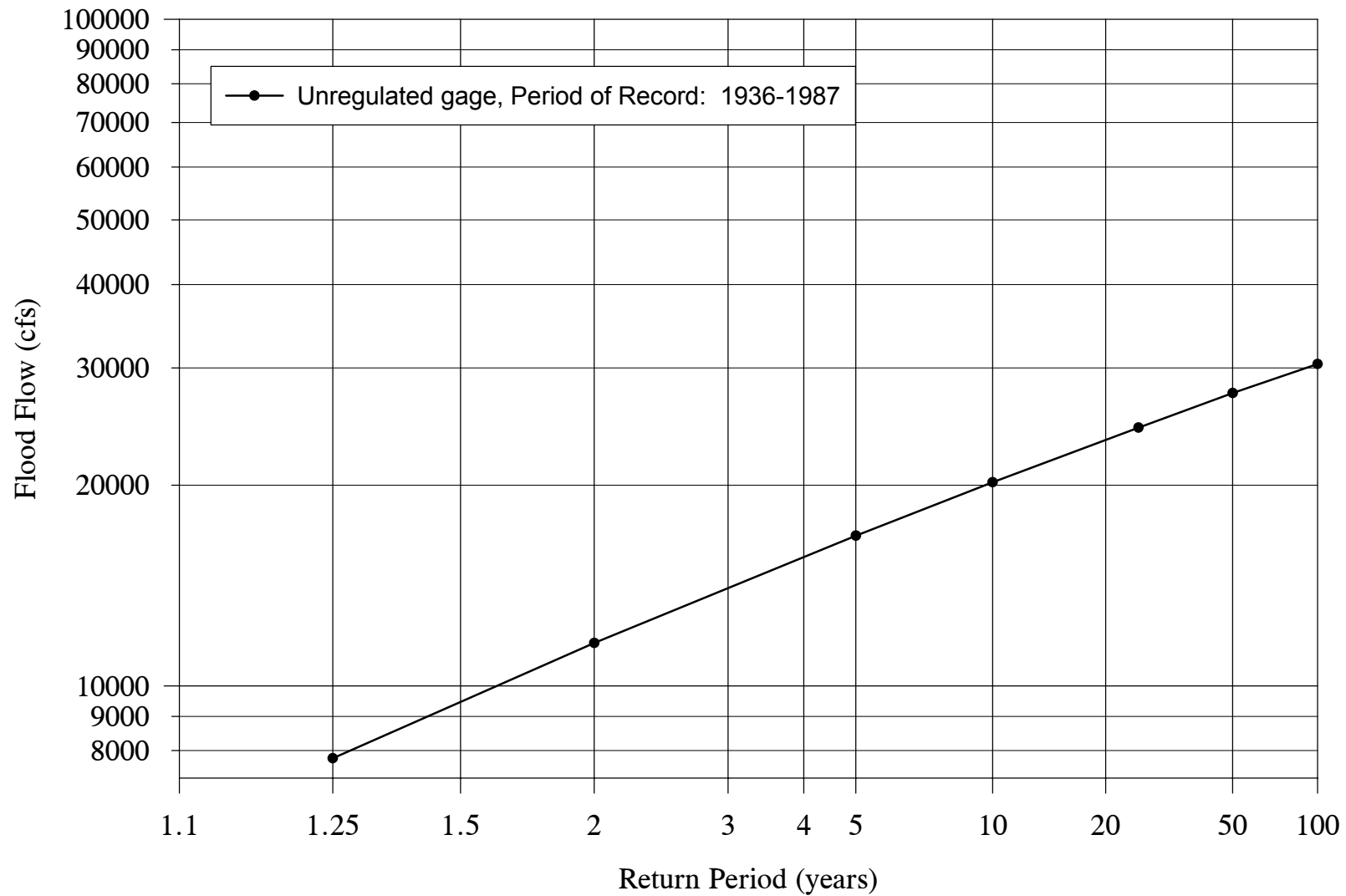


Figure F-10. Estimated flood-frequency relationship for USGS Gage No. 14154500 Row River above Pitcher Creek, near Dorena, Oregon.

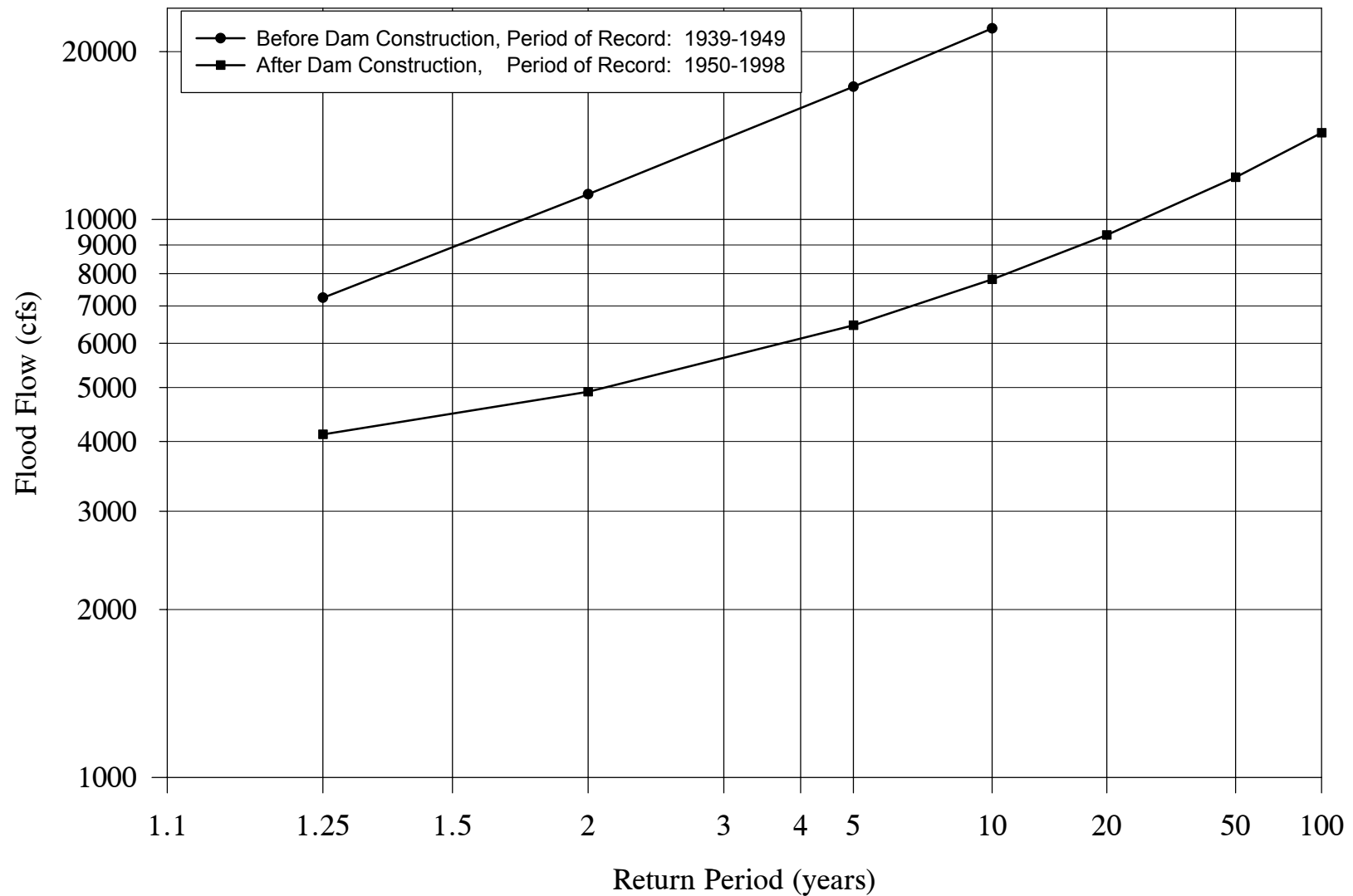


Figure F-11. Estimated flood-frequency relationship for USGS Gage No. 14155500 Row River near Cottage Grove, Oregon.

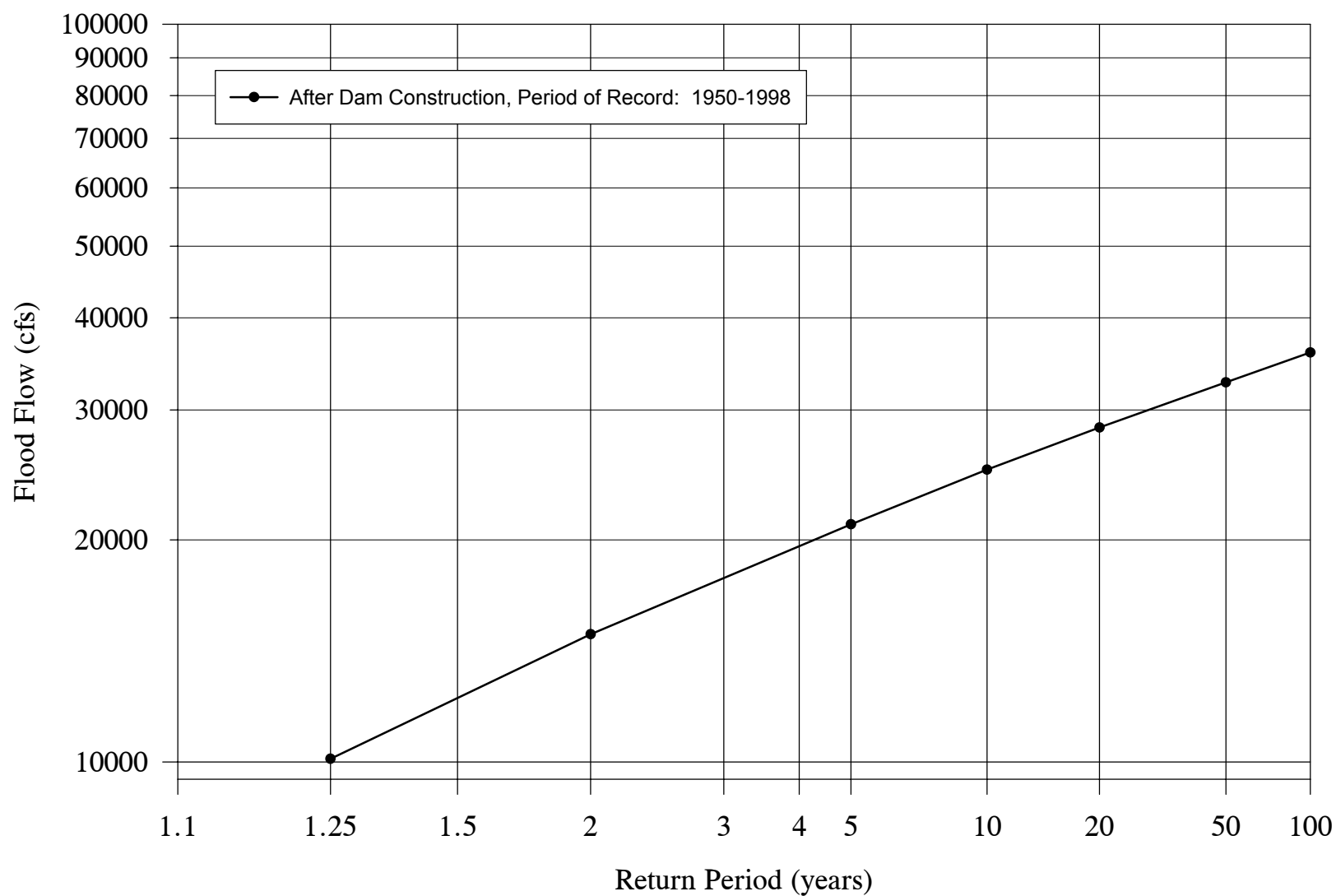


Figure F-12. Estimated flood-frequency relationship for USGS Gage No. 14157500 Coast Fork Willamette River near Goshen, Oregon.

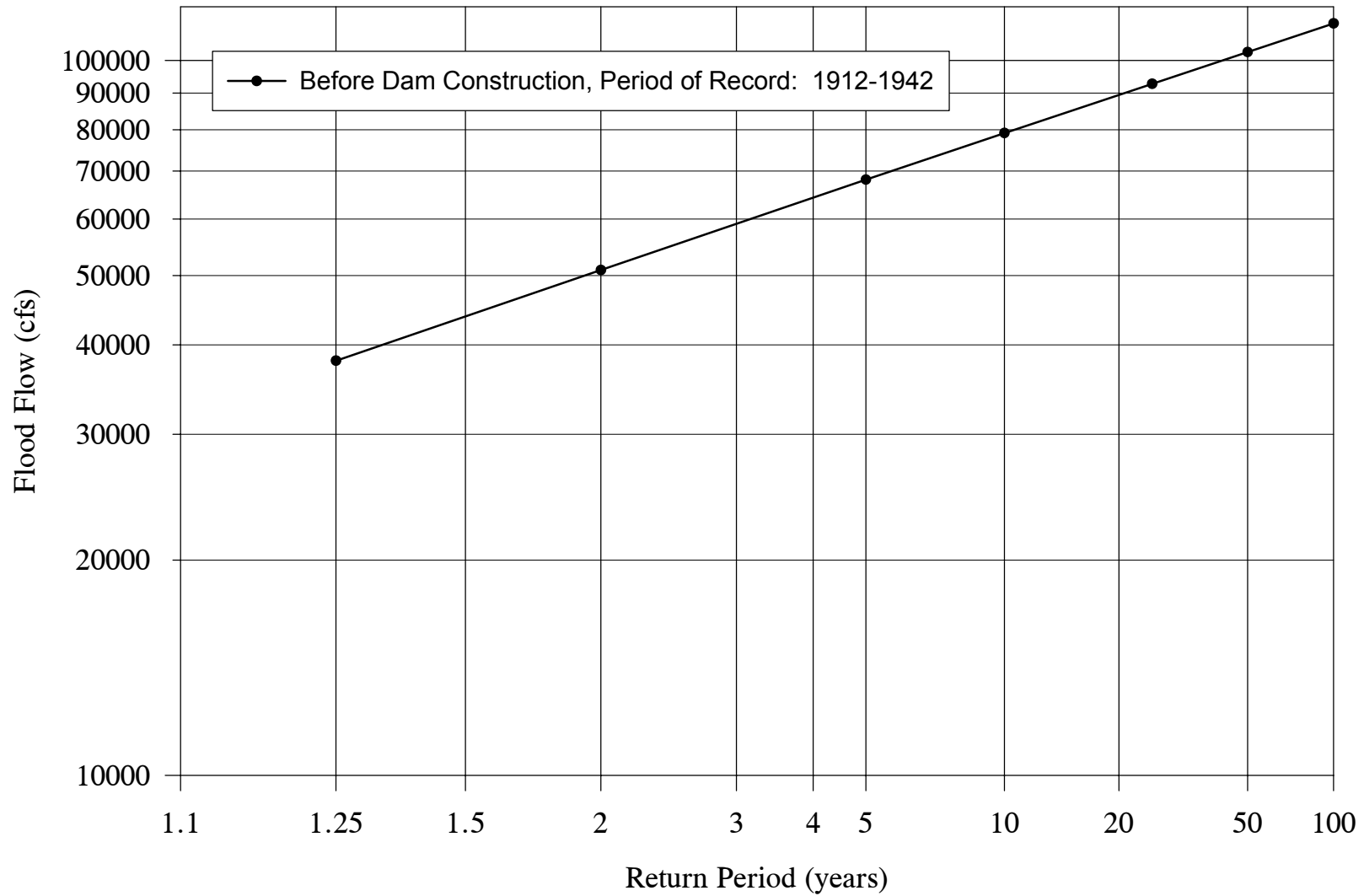


Figure F-13. Estimated flood-frequency relationship for USGS Gage No. 14158000 Willamette River at Springfield, Oregon

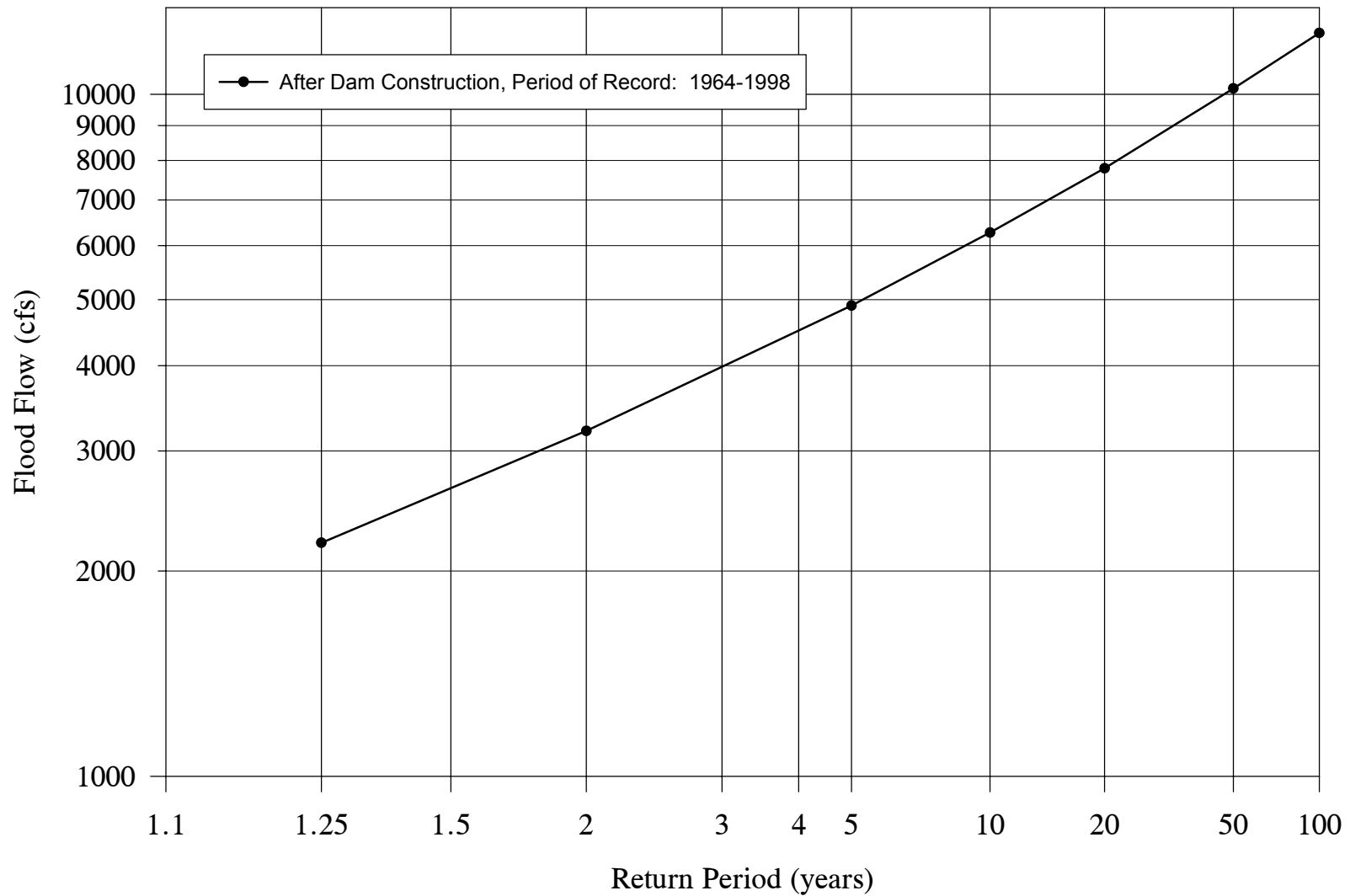


Figure F-14. Estimated flood-frequency relationship for USGS Gage No. 14158850 McKenzie River below Trail Bridge Dam near Belknap Springs, Oregon.

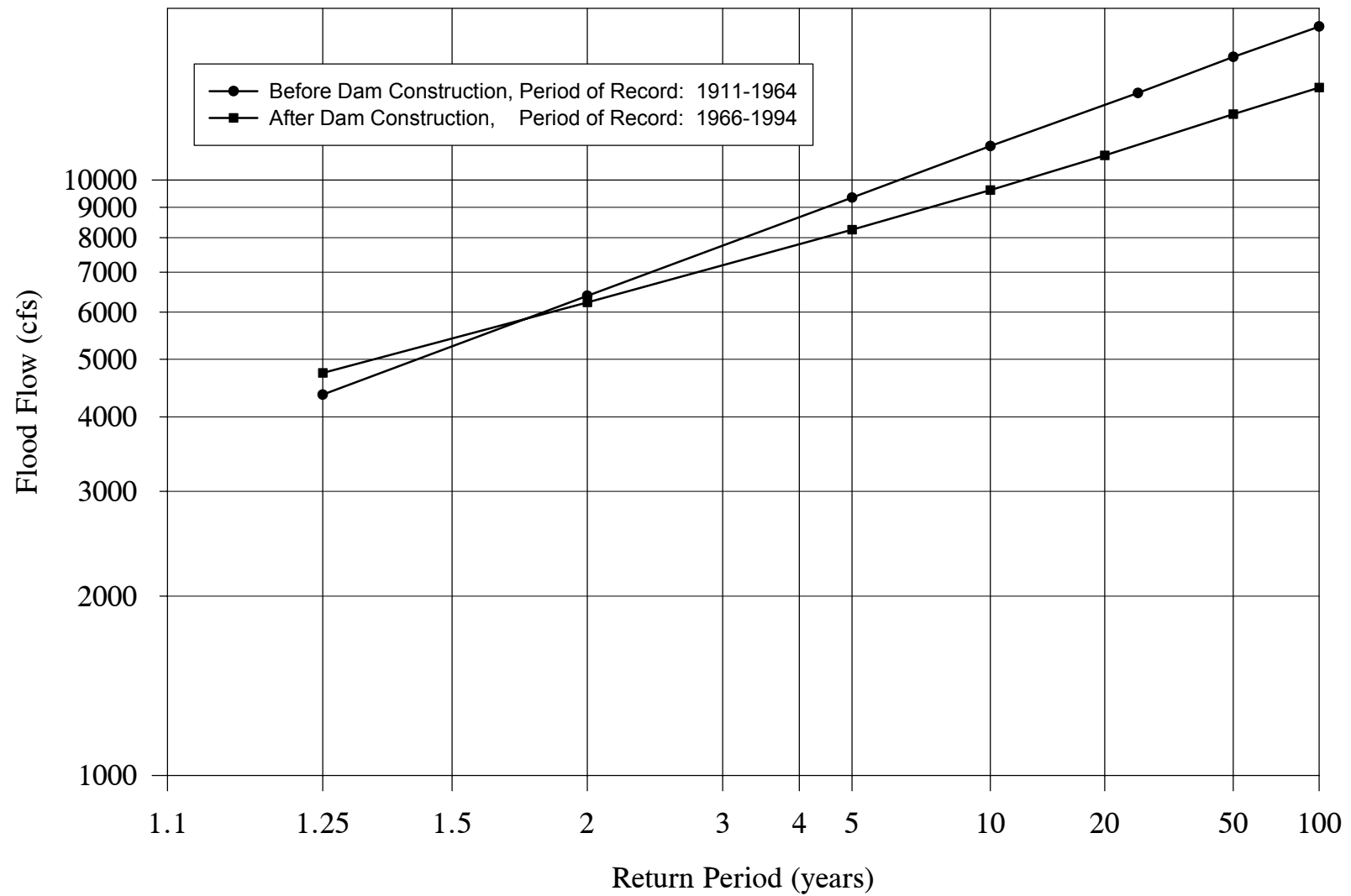


Figure F-15. Estimated flood-frequency relationship for USGS Gage No. 14159000 McKenzie River at McKenzie Bridge, Oregon.

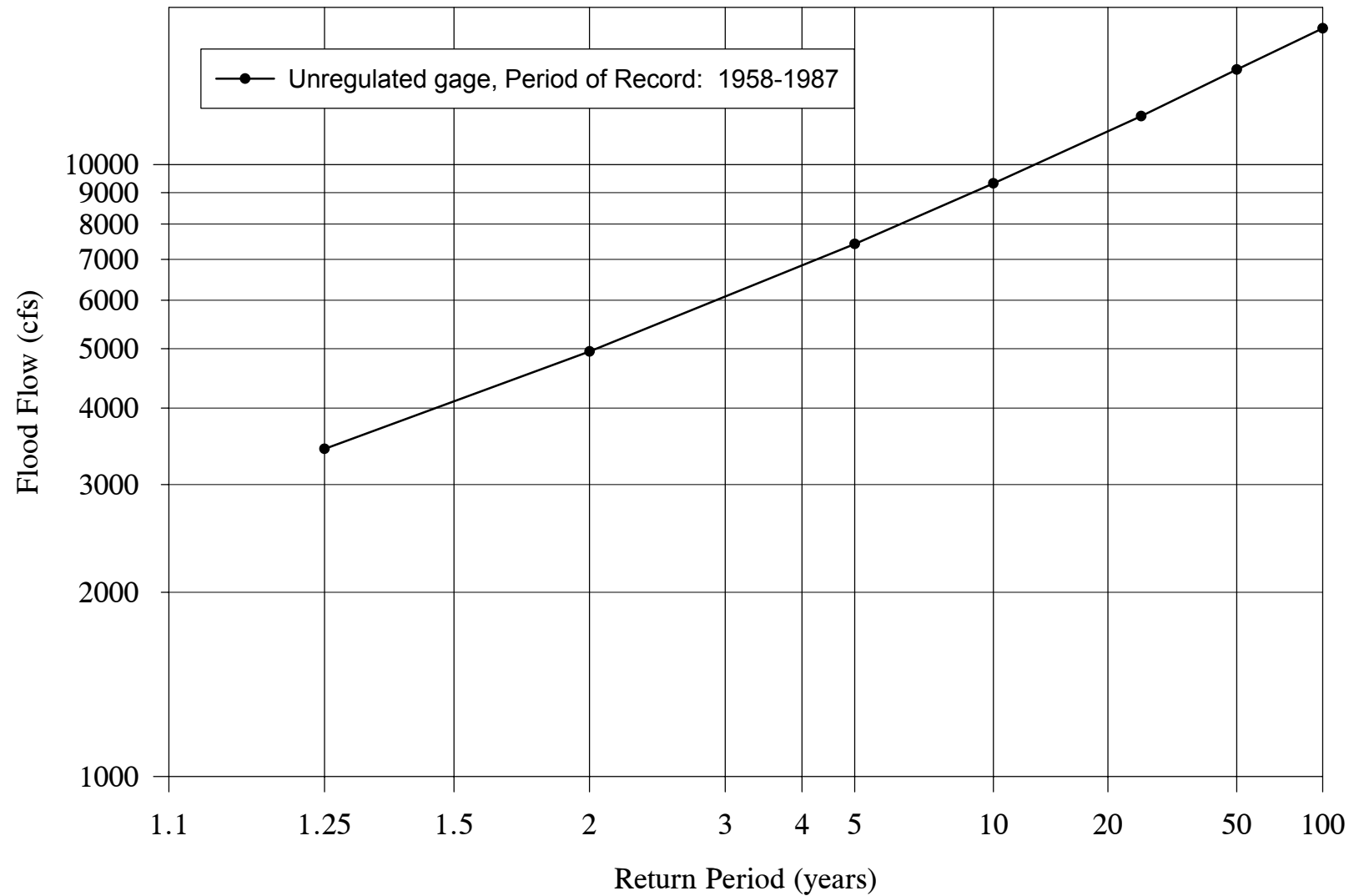


Figure F-16. Estimated flood-frequency relationship for USGS Gage No. 14159200 South Fork McKenzie River above Cougar Lake near Rainbow, Oregon.

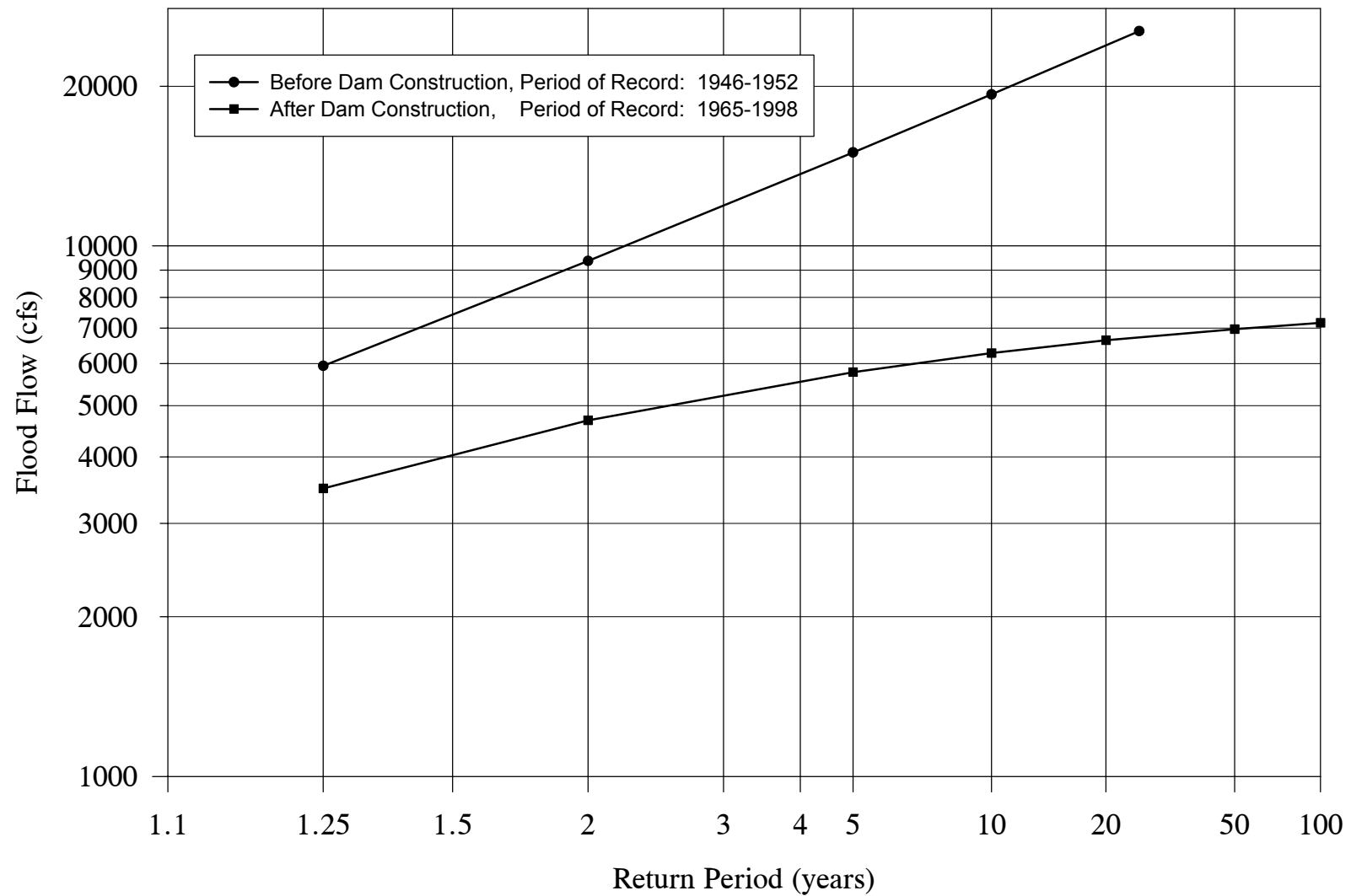


Figure F-17. Estimated flood-frequency relationship for USGS Gage No. 14159500 South Fork McKenzie River near Rainbow, Oregon.

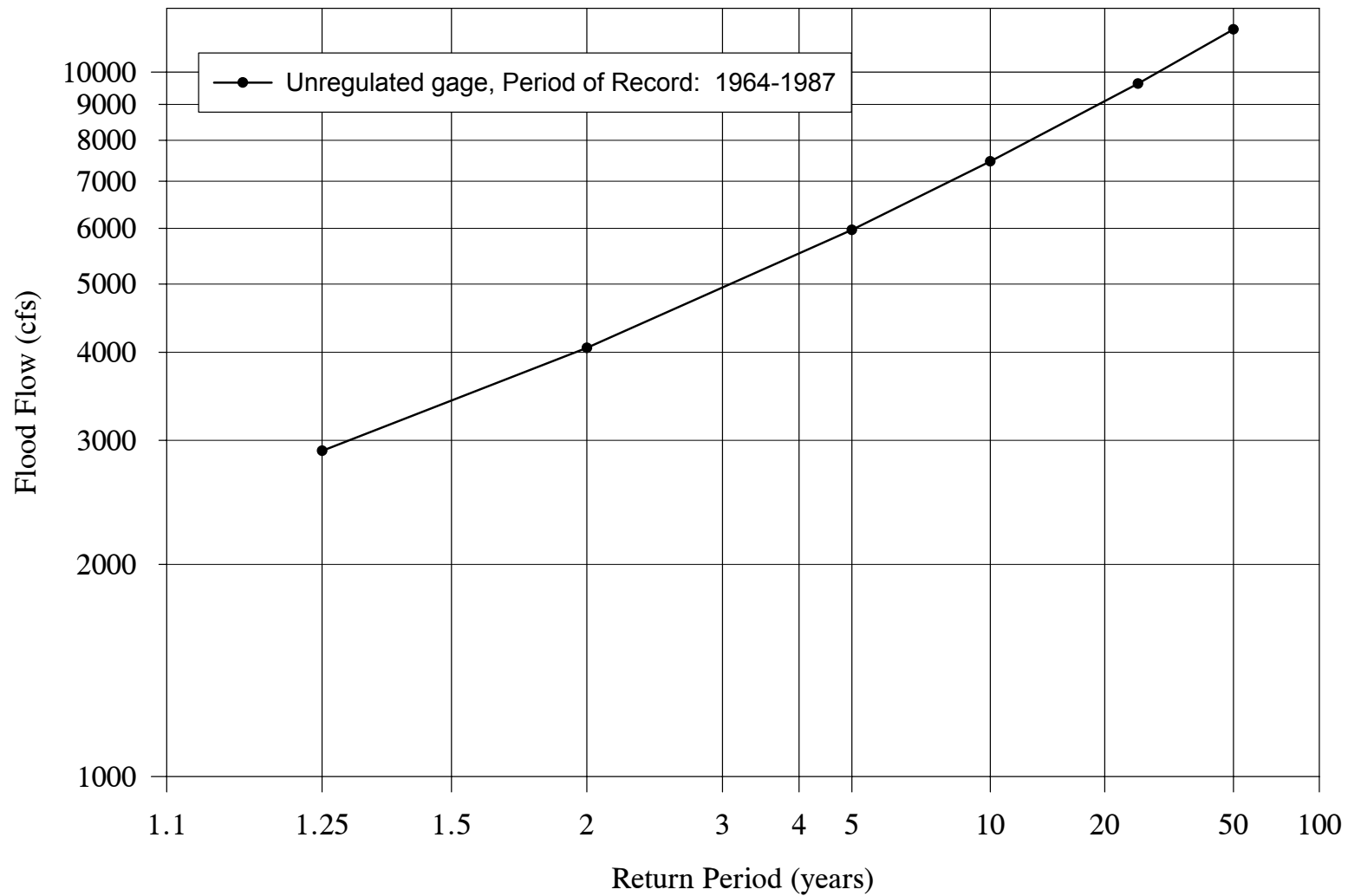


Figure F-18. Estimated flood-frequency relationship for USGS Gage No. 14161100 Blue River below Tidbits Creek near Blue River, Oregon.

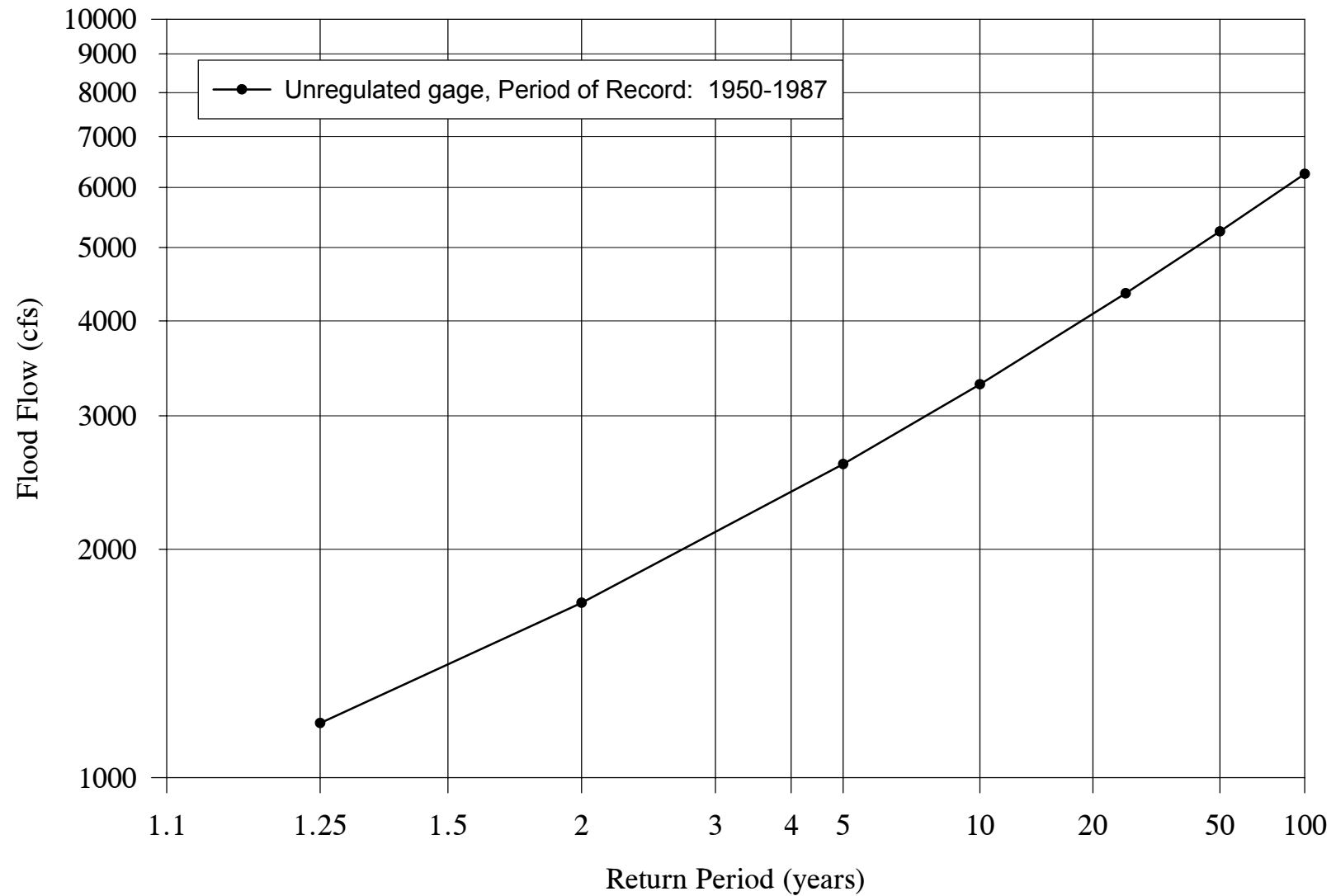


Figure F-19. Estimated flood-frequency relationship for USGS Gage No. 14161500 Lookout Creek near Blue River, Oregon.

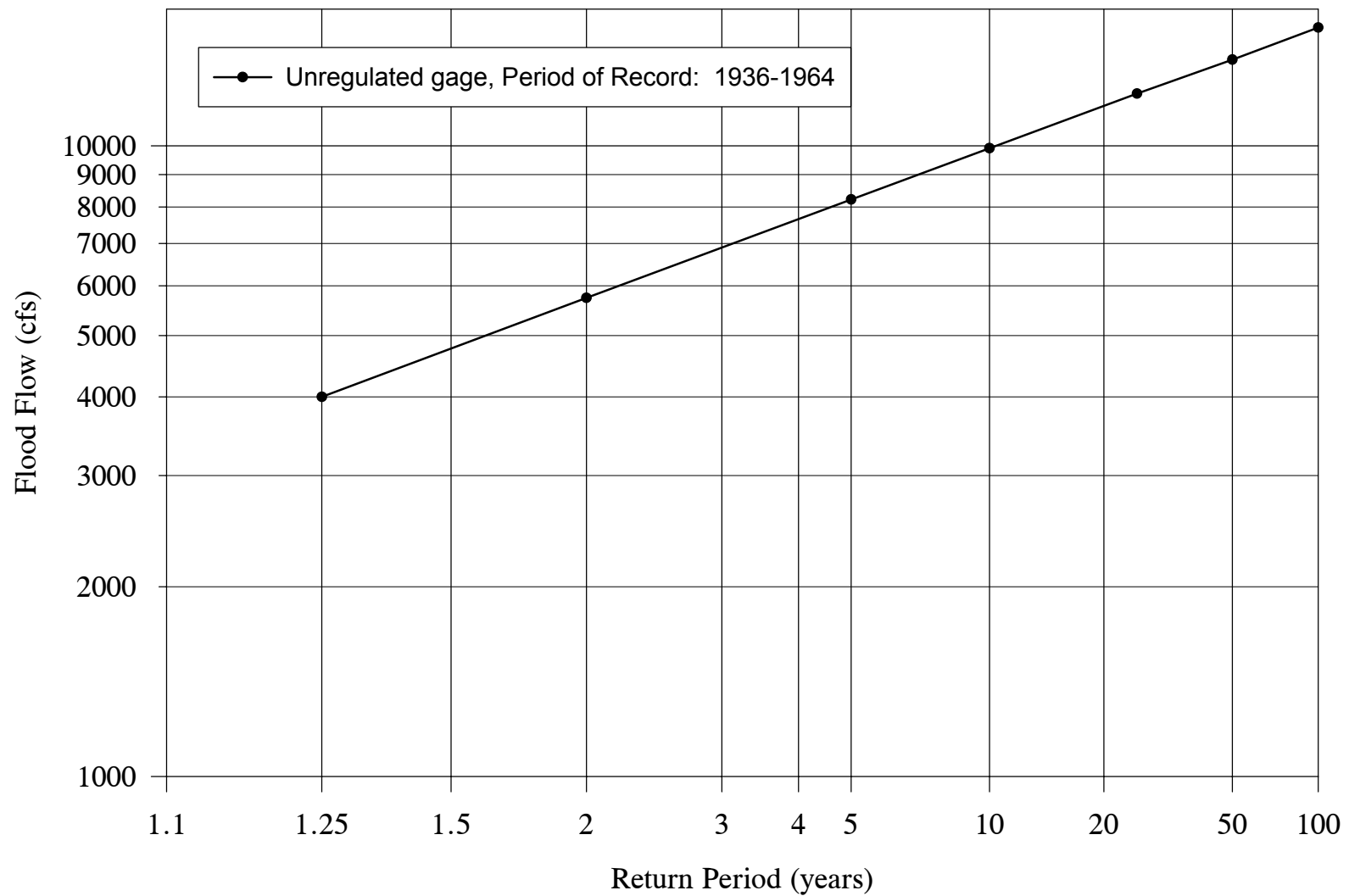


Figure F-20. Estimated flood-frequency relationship for USGS Gage No. 14162000 Blue River near Blue River, Oregon.

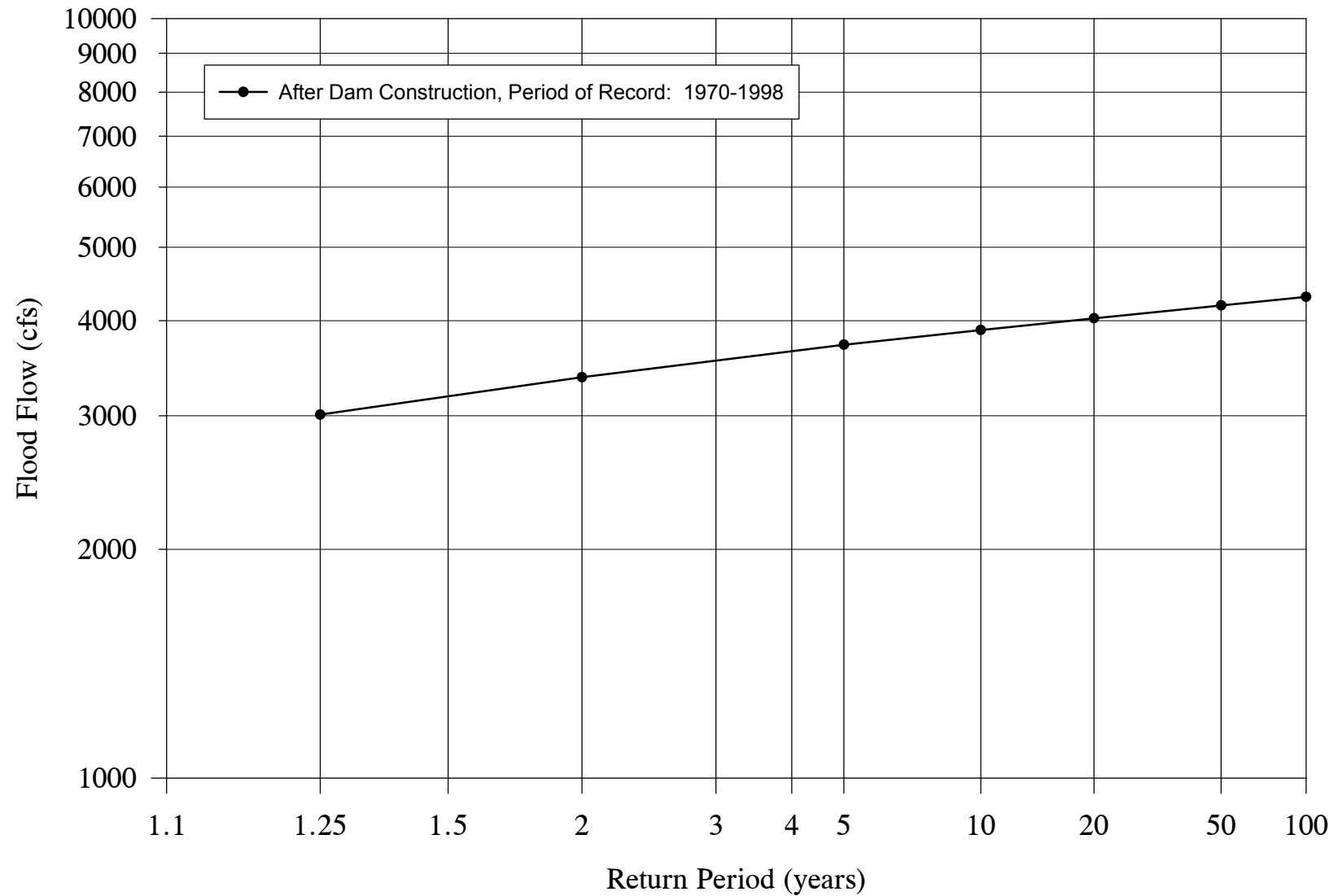


Figure F-21. Estimated flood-frequency relationship for USGS Gage No. 14162200 Blue River at Blue River, Oregon.

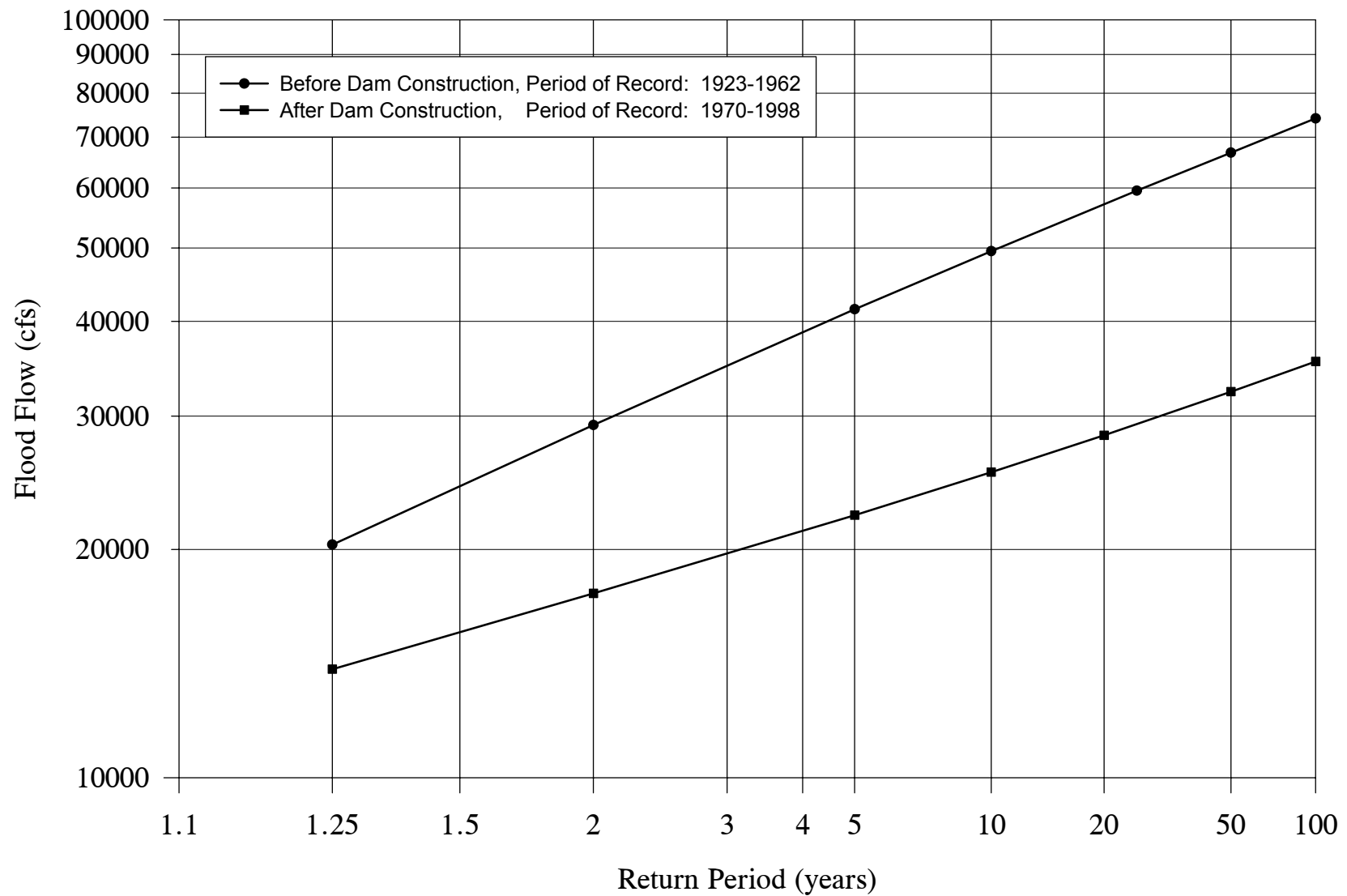


Figure F-22. Estimated flood-frequency relationship for USGS Gage No. 14162500 McKenzie River near Vida, Oregon.

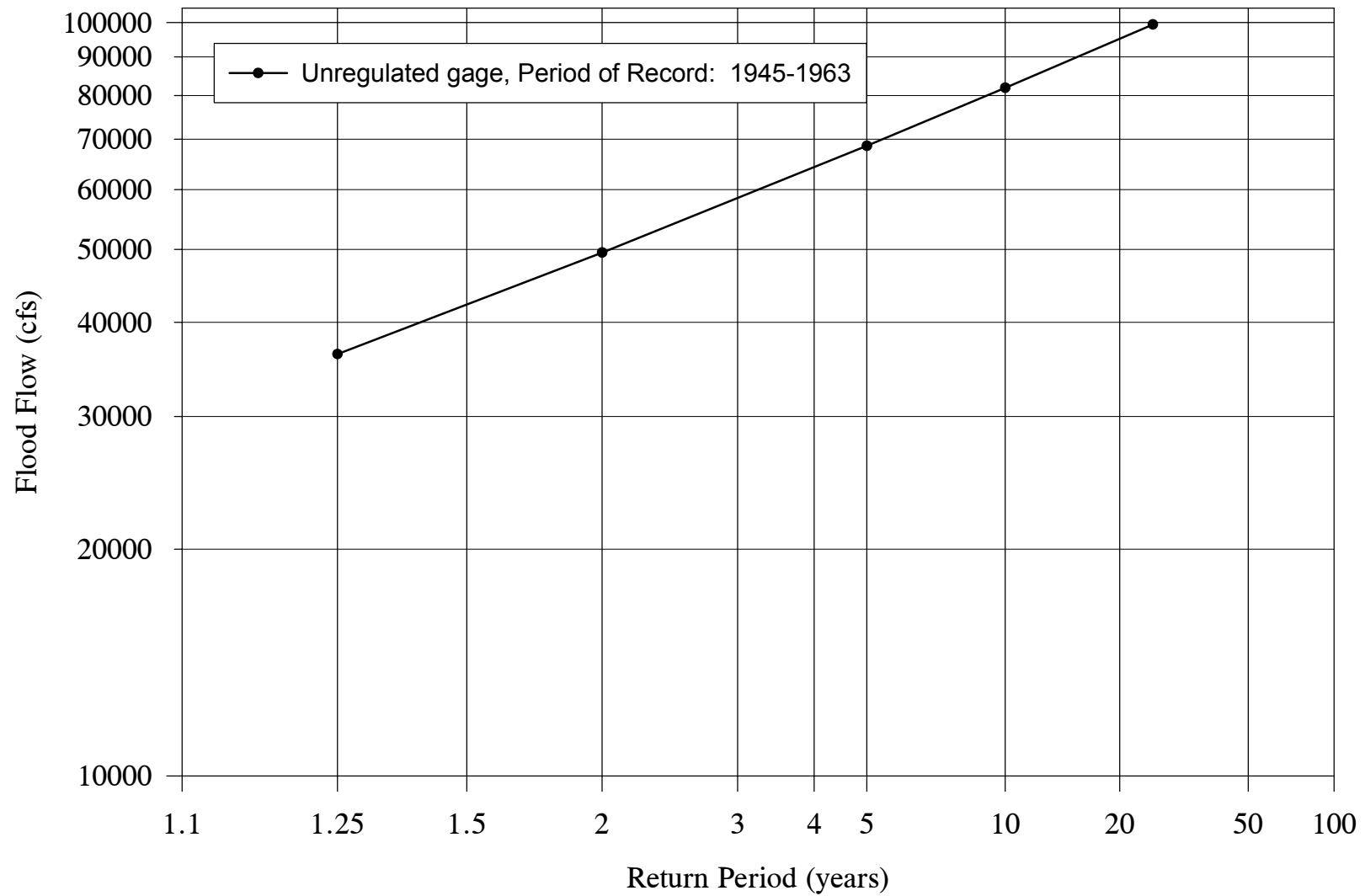


Figure F-23. Estimated flood-frequency relationship for USGS Gage No. 14165500 McKenzie River near Coburg, Oregon.

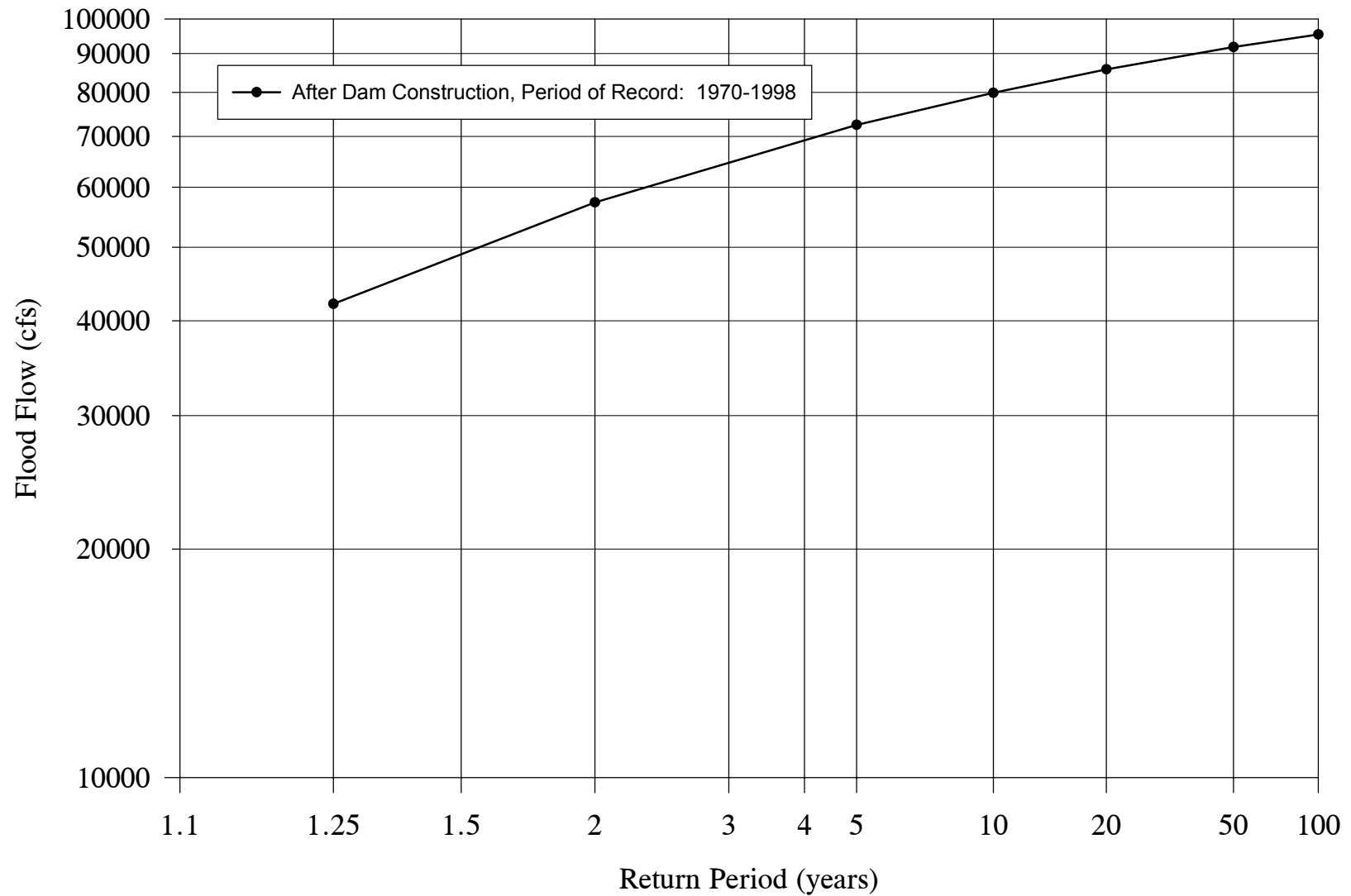


Figure F-24. Estimated flood-frequency relationship for USGS Gage No. 14166000 Willamette River at Harrisburg, Oregon.

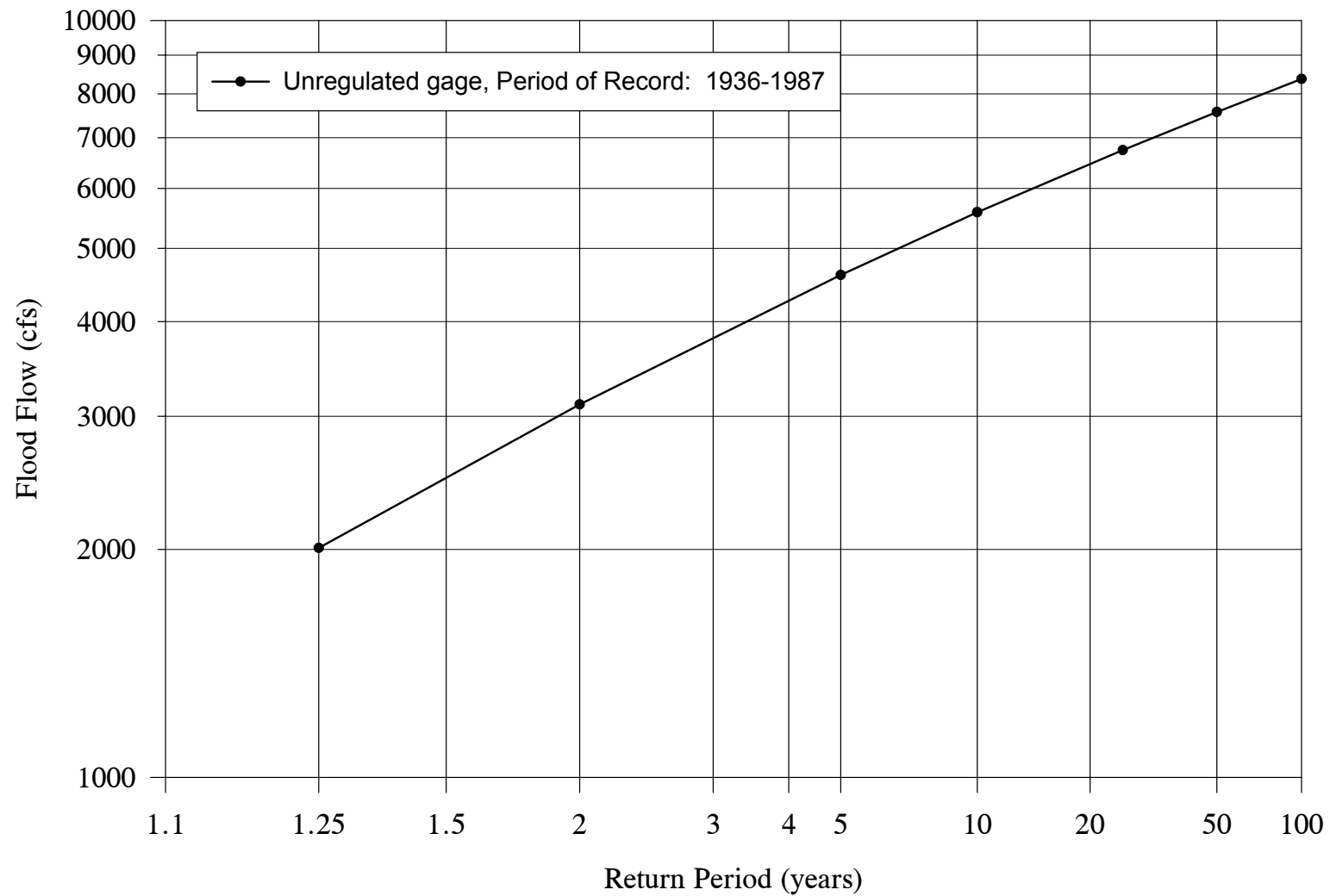


Figure F-25. Estimated flood-frequency relationship for USGS Gage No. 14166500 Long Tom River near Noti, Oregon.

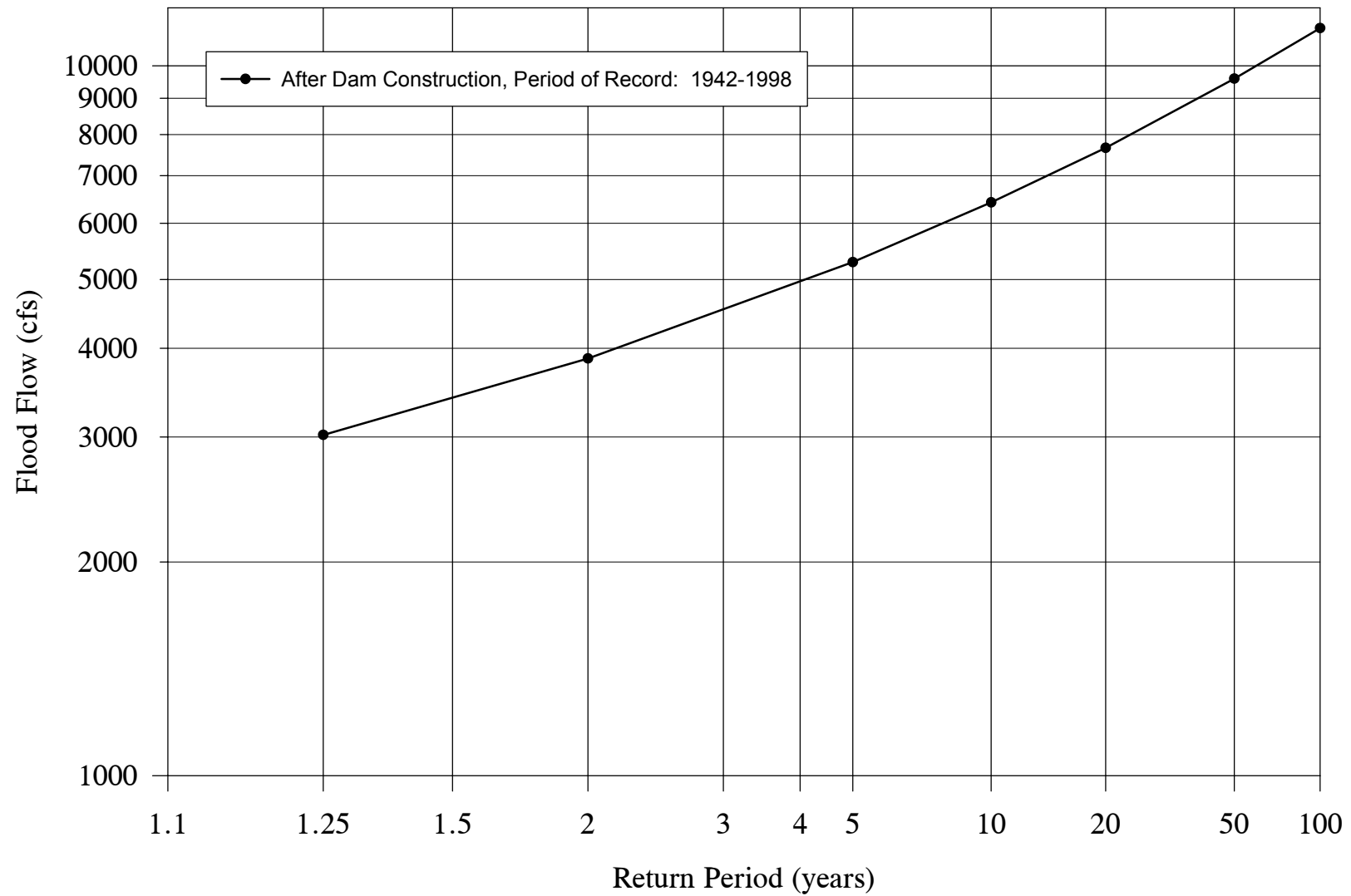


Figure F-26. Estimated flood-frequency relationship for USGS Gage No. 14169001 Long Tom River near Alvadore, Oregon.

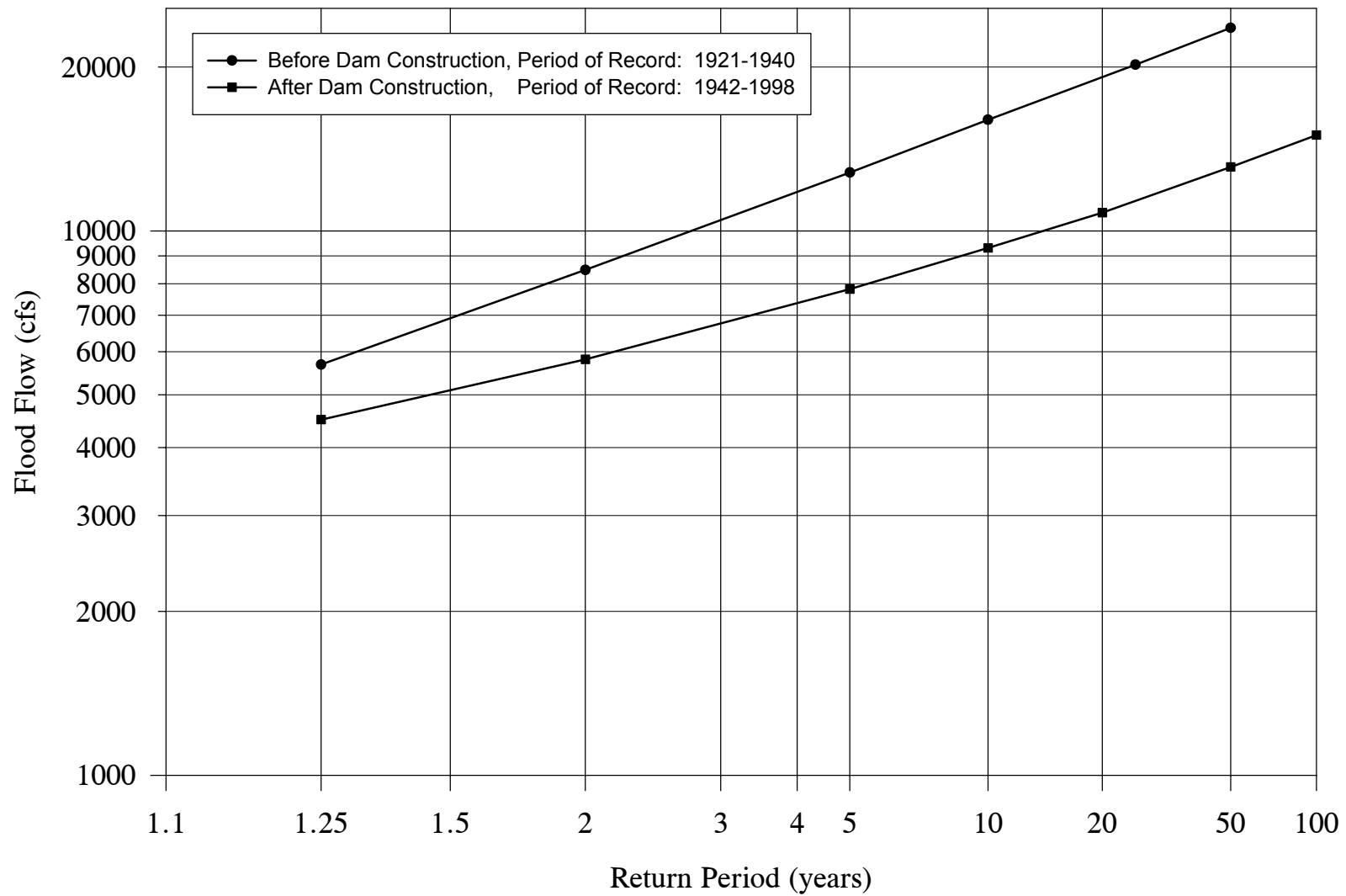


Figure F-27. Estimated flood-frequency relationship for USGS Gage No. 14170000 Long Tom River at Monroe, Oregon.

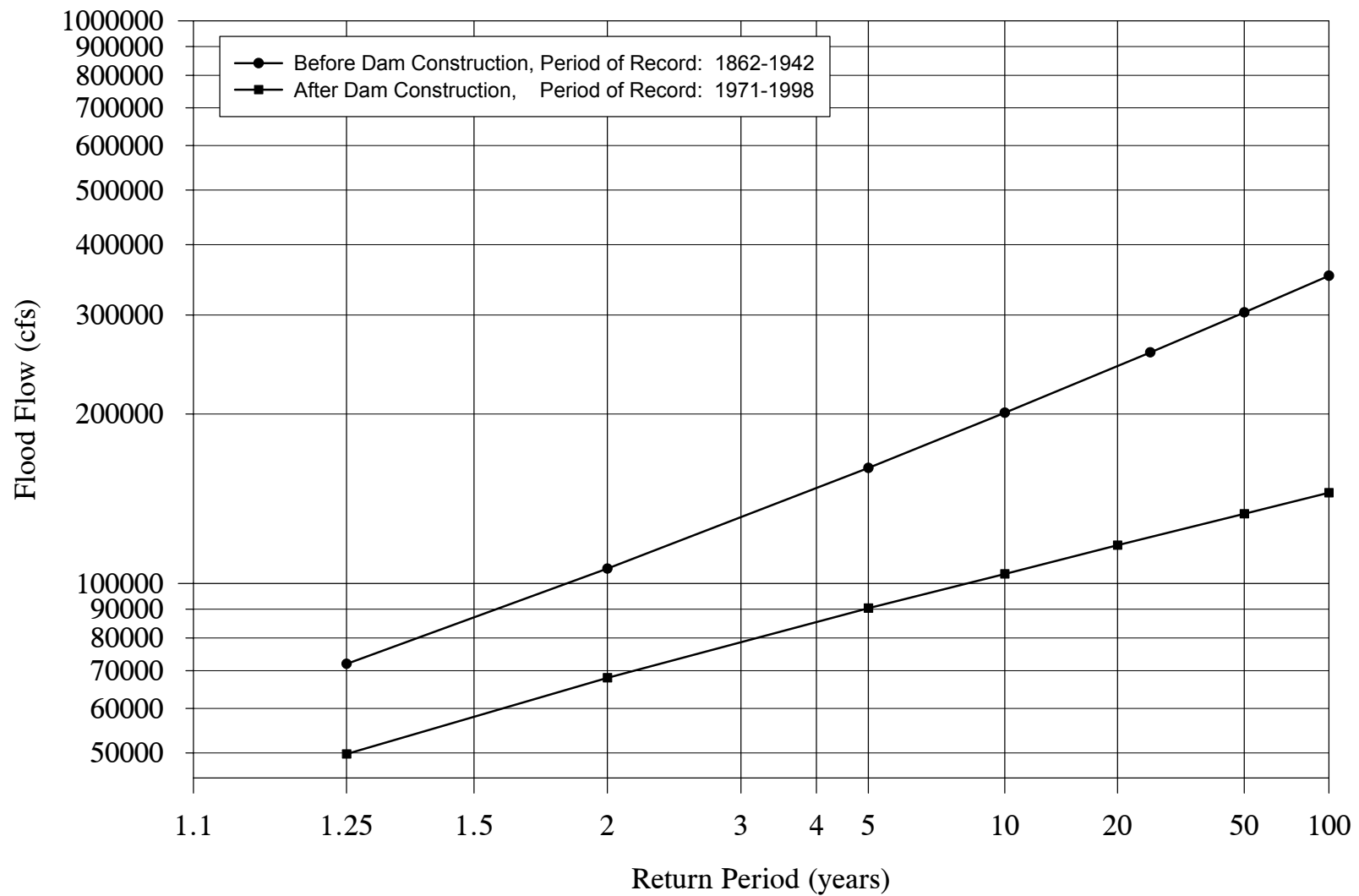


Figure F-28. Estimated flood-frequency relationship for USGS Gage No. 14174000 Willamette River at Albany, Oregon.

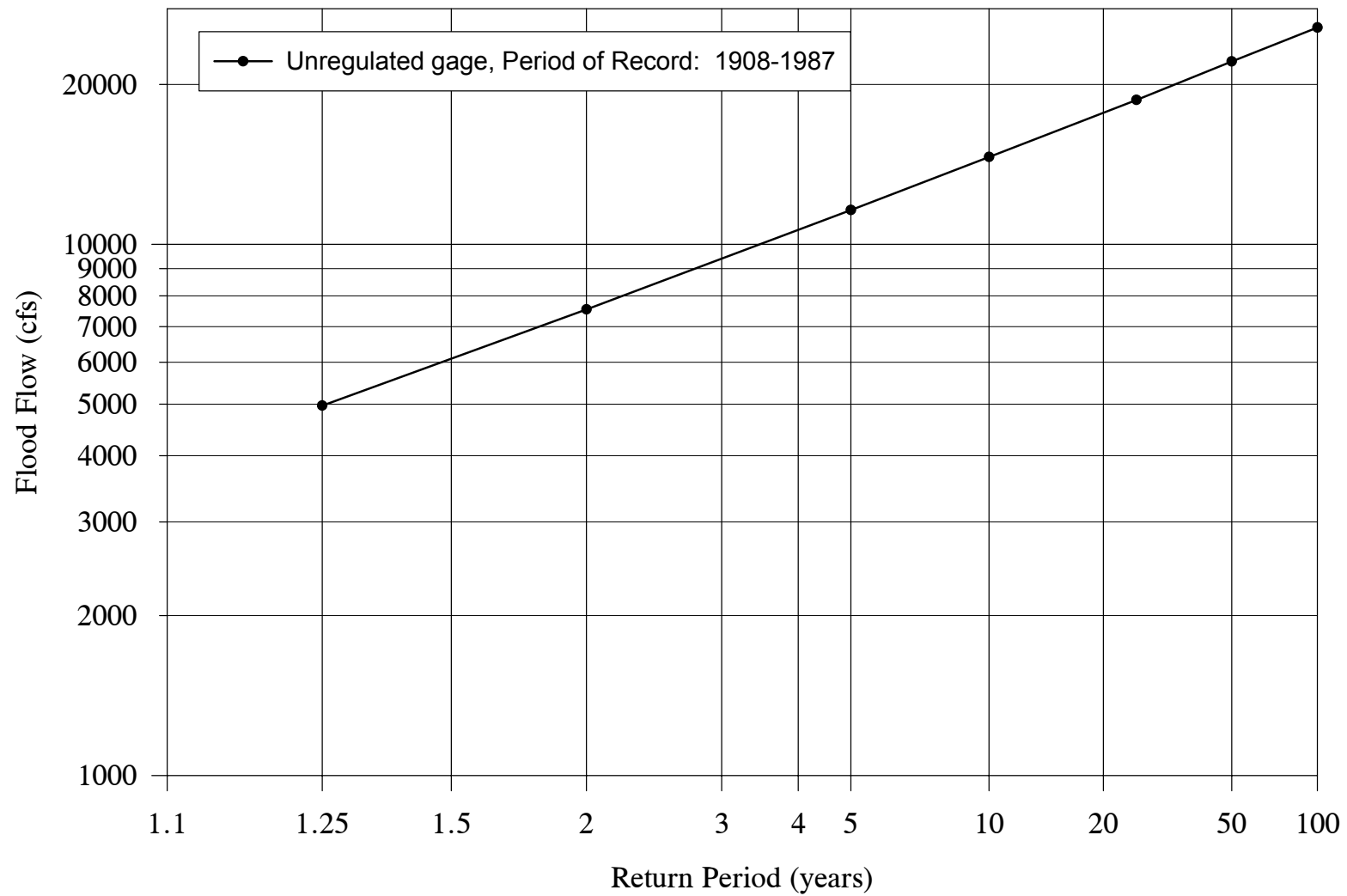


Figure F-29. Estimated flood-frequency relationship for USGS Gage No. 14178000 North Santiam River below Boulder Creek near Detroit, Oregon.

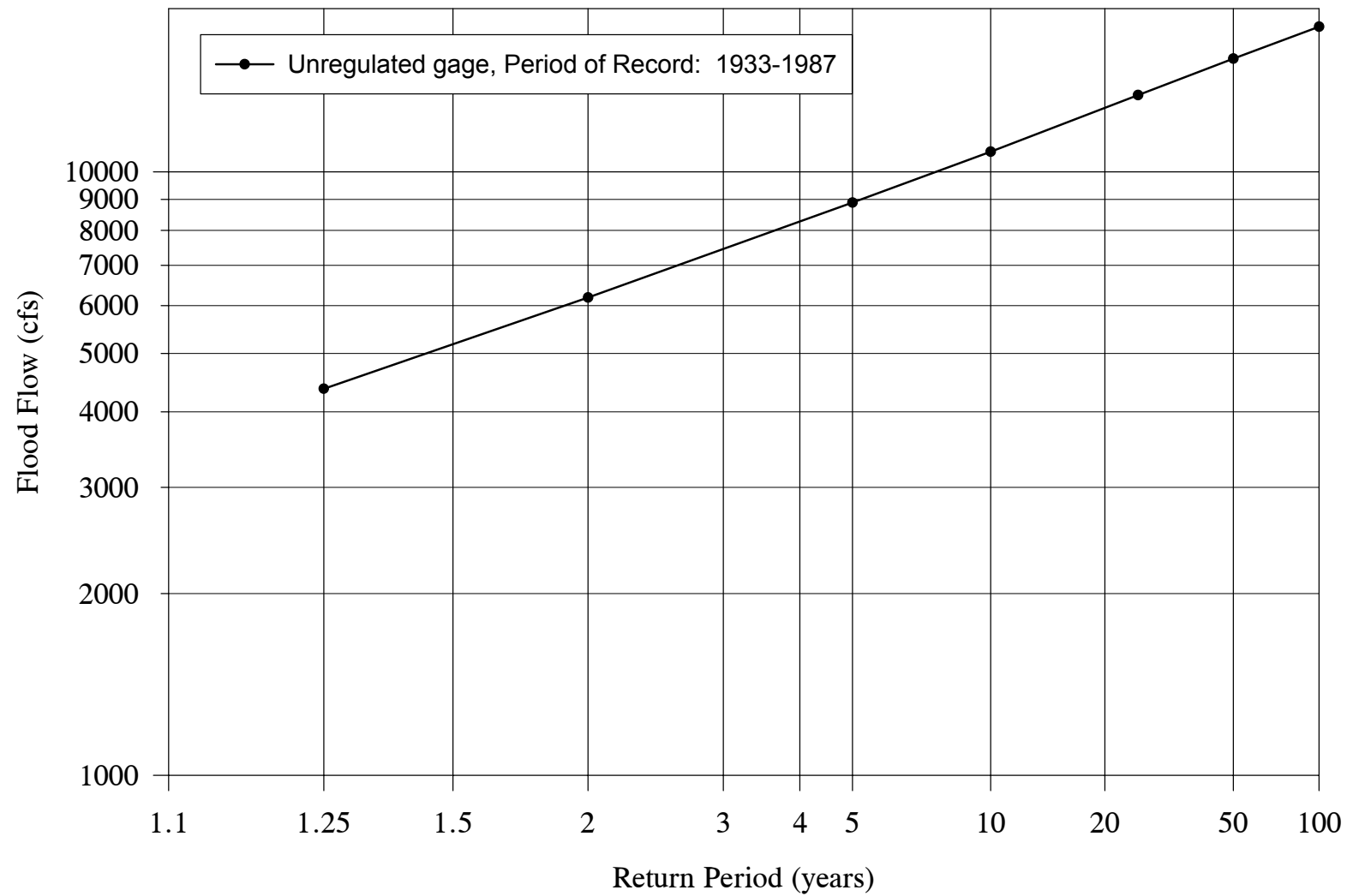


Figure F-30. Estimated flood-frequency relationship for USGS Gage No. 14179000 Breitenbush River above French Creek near Detroit, Oregon.

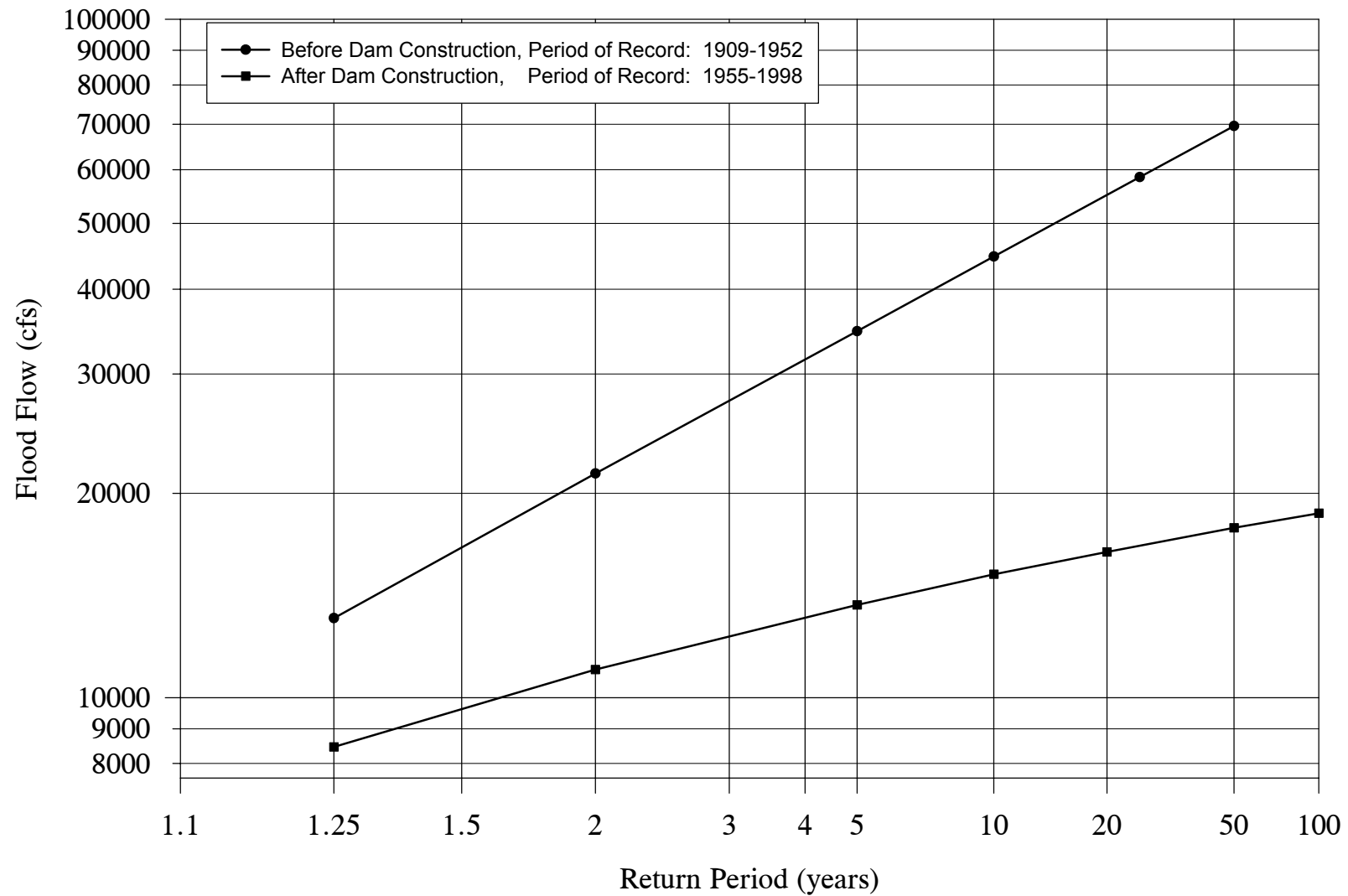


Figure F-31. Estimated flood-frequency relationship for USGS Gage No. 1418500 North Santiam River at Niagara, Oregon.

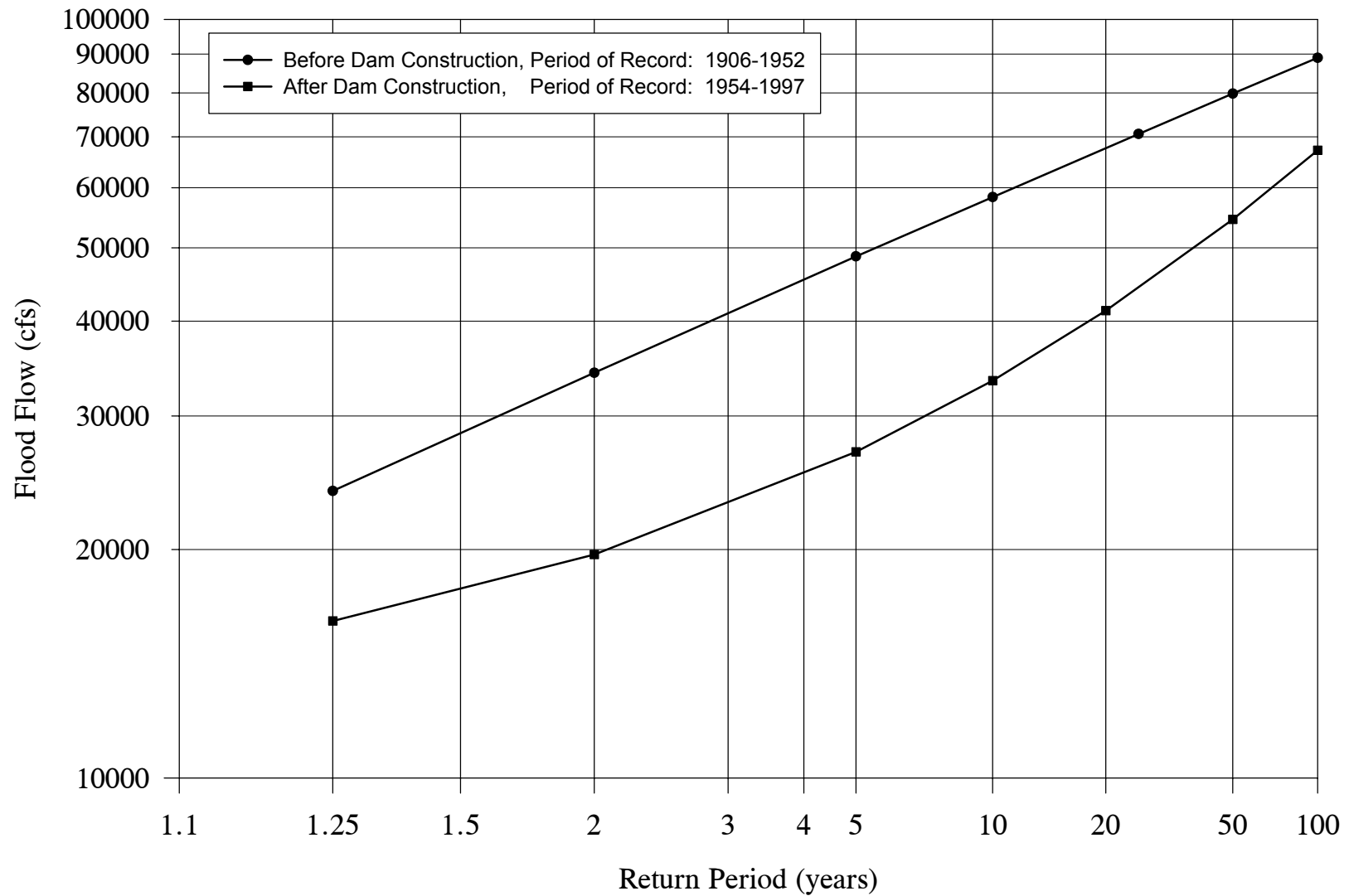


Figure F-32. Estimated flood-frequency relationship for USGS Gage No. 14183000 North Santiam River at Mehama, Oregon.

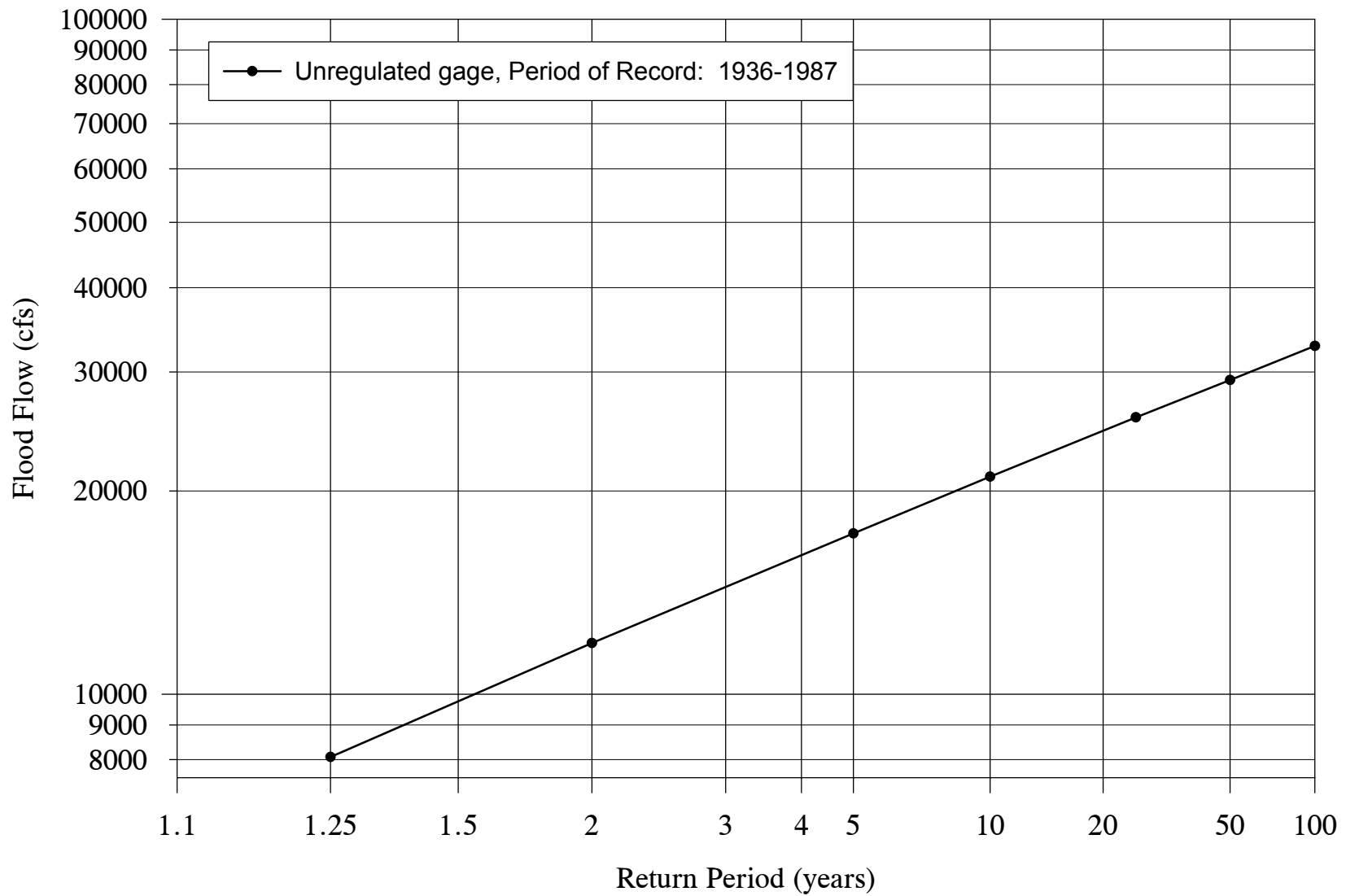


Figure F-33. Estimated flood-frequency relationship for USGS Gage No. 14185000 South Santiam River below Cascadia, Oregon.

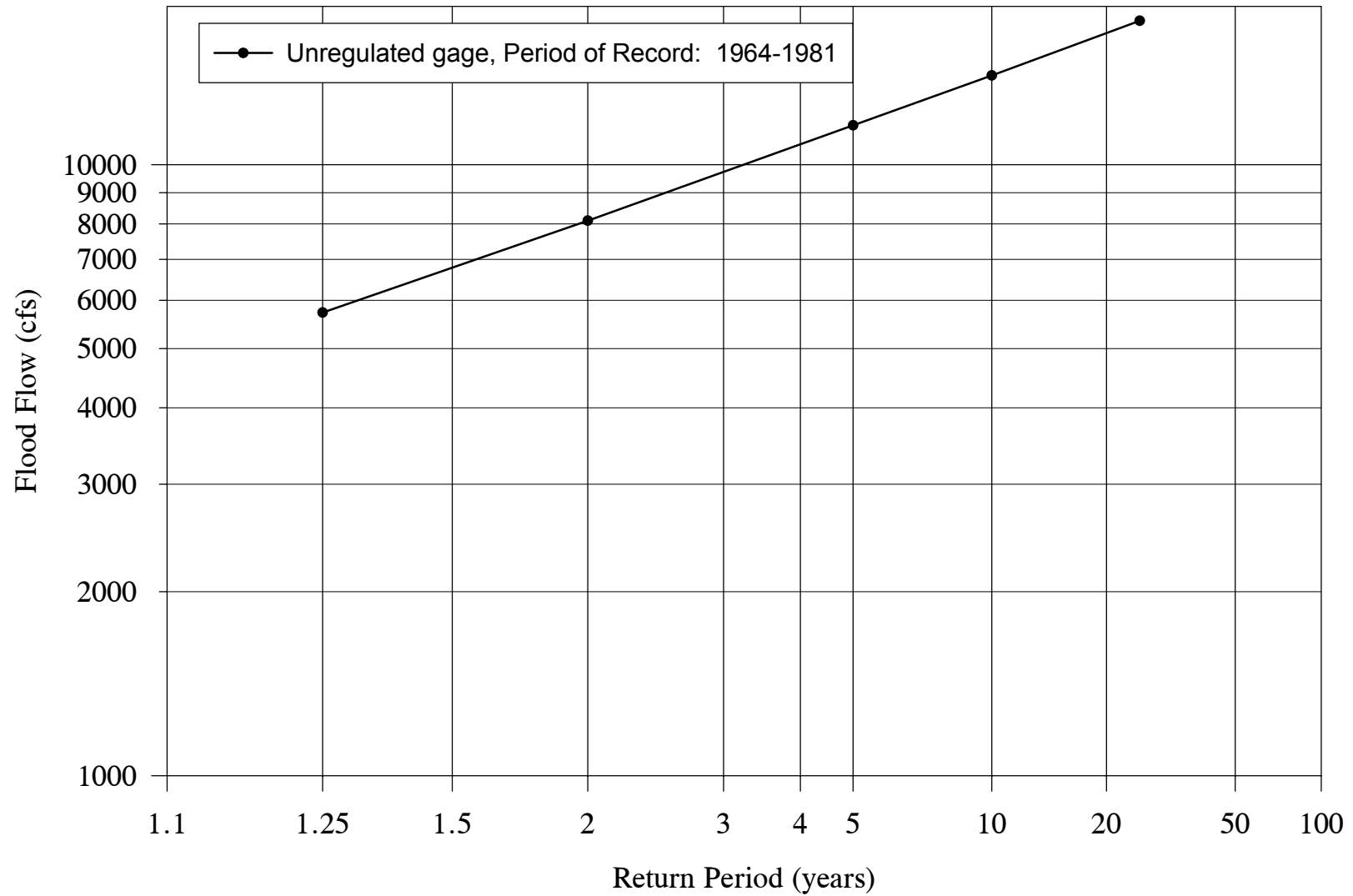


Figure F-34. Estimated flood-frequency relationship for USGS Gage No. 14185800 Middle Santiam River near Cascadia, Oregon.

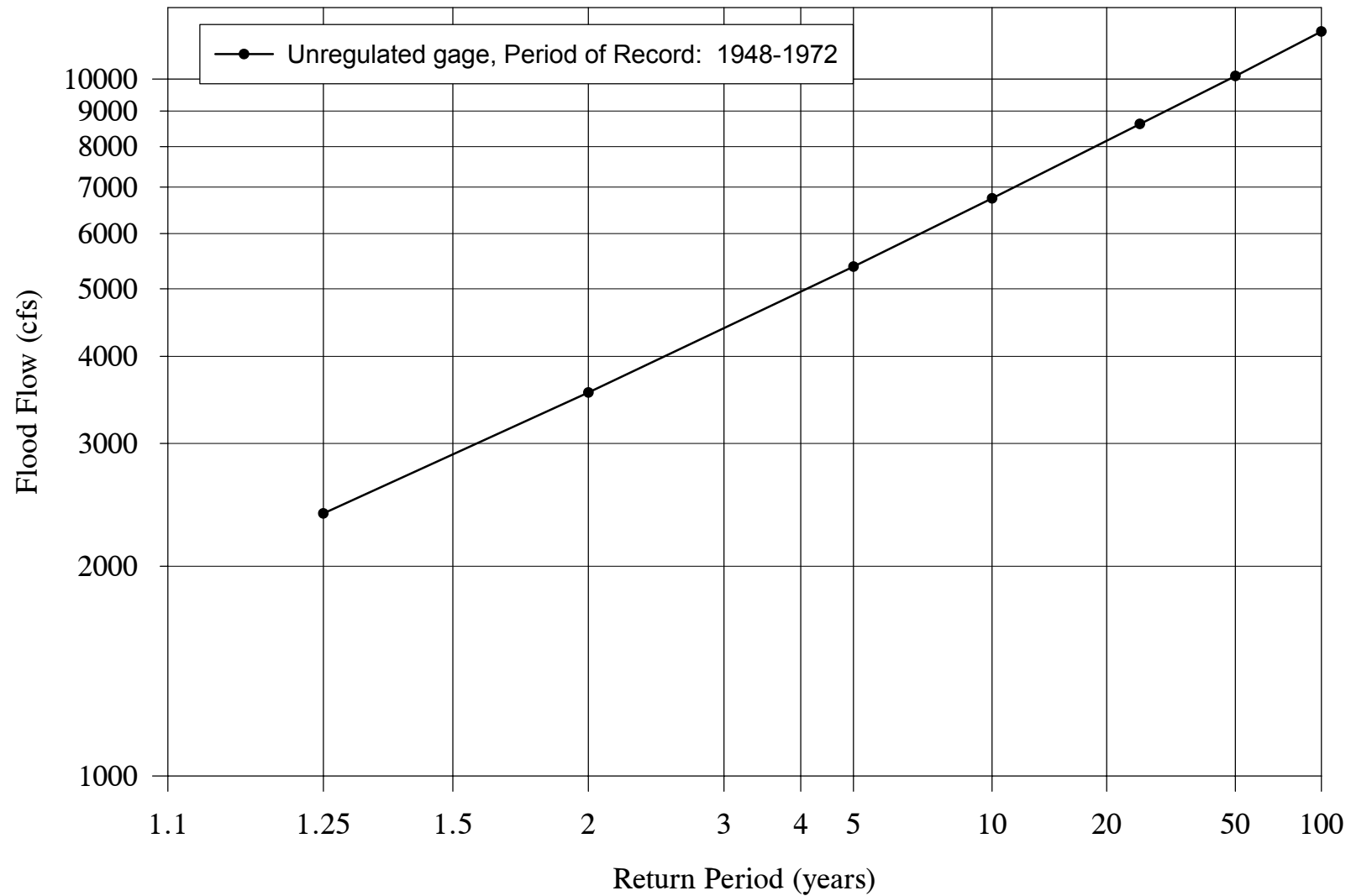


Figure F-35. Estimated flood-frequency relationship for USGS Gage No. 14187000 Wiley Creek near Foster, Oregon.

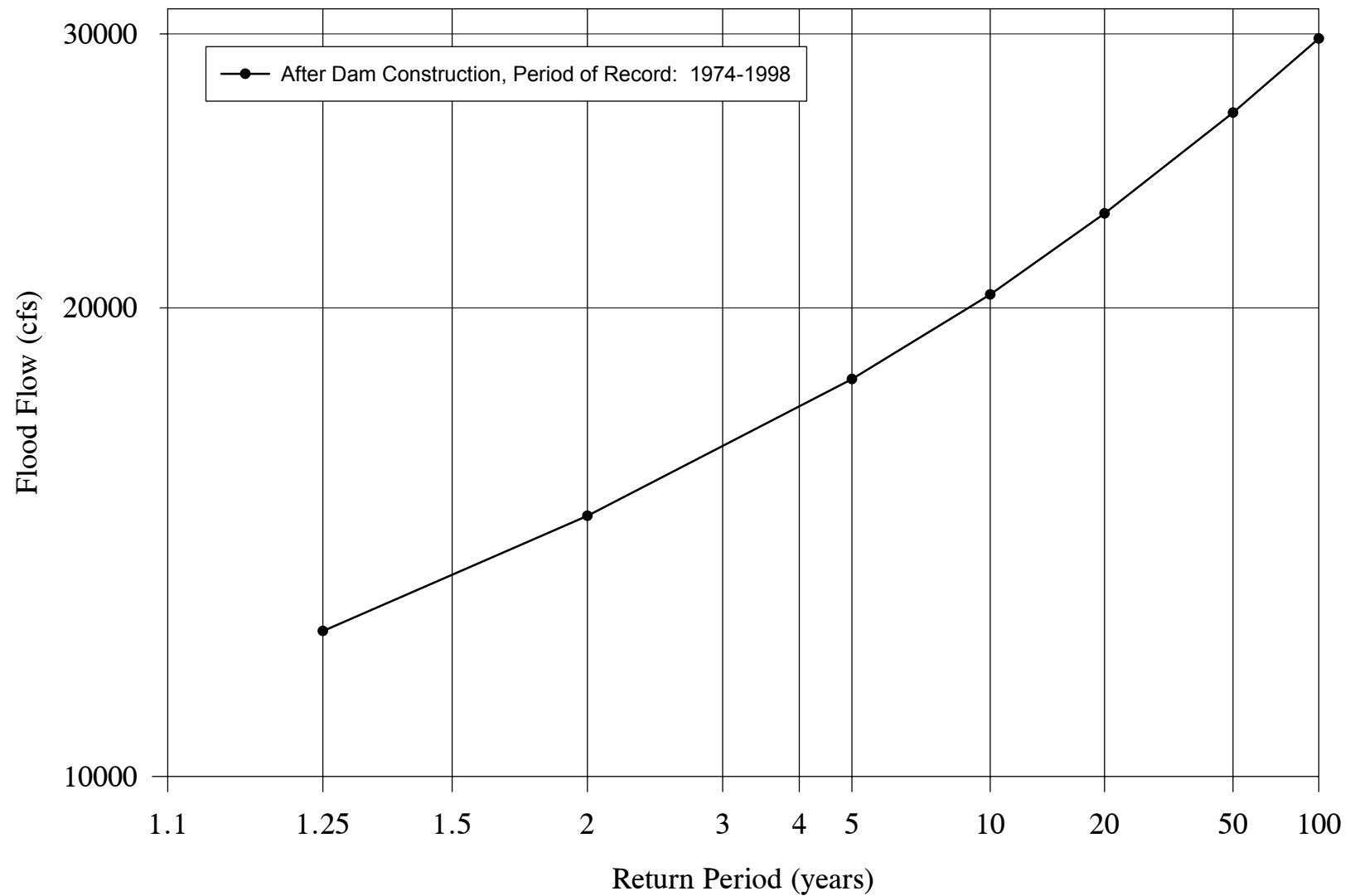


Figure F-36. Estimated flood-frequency relationship for USGS Gage No. 14187200 South Santiam River near Foster, Oregon.

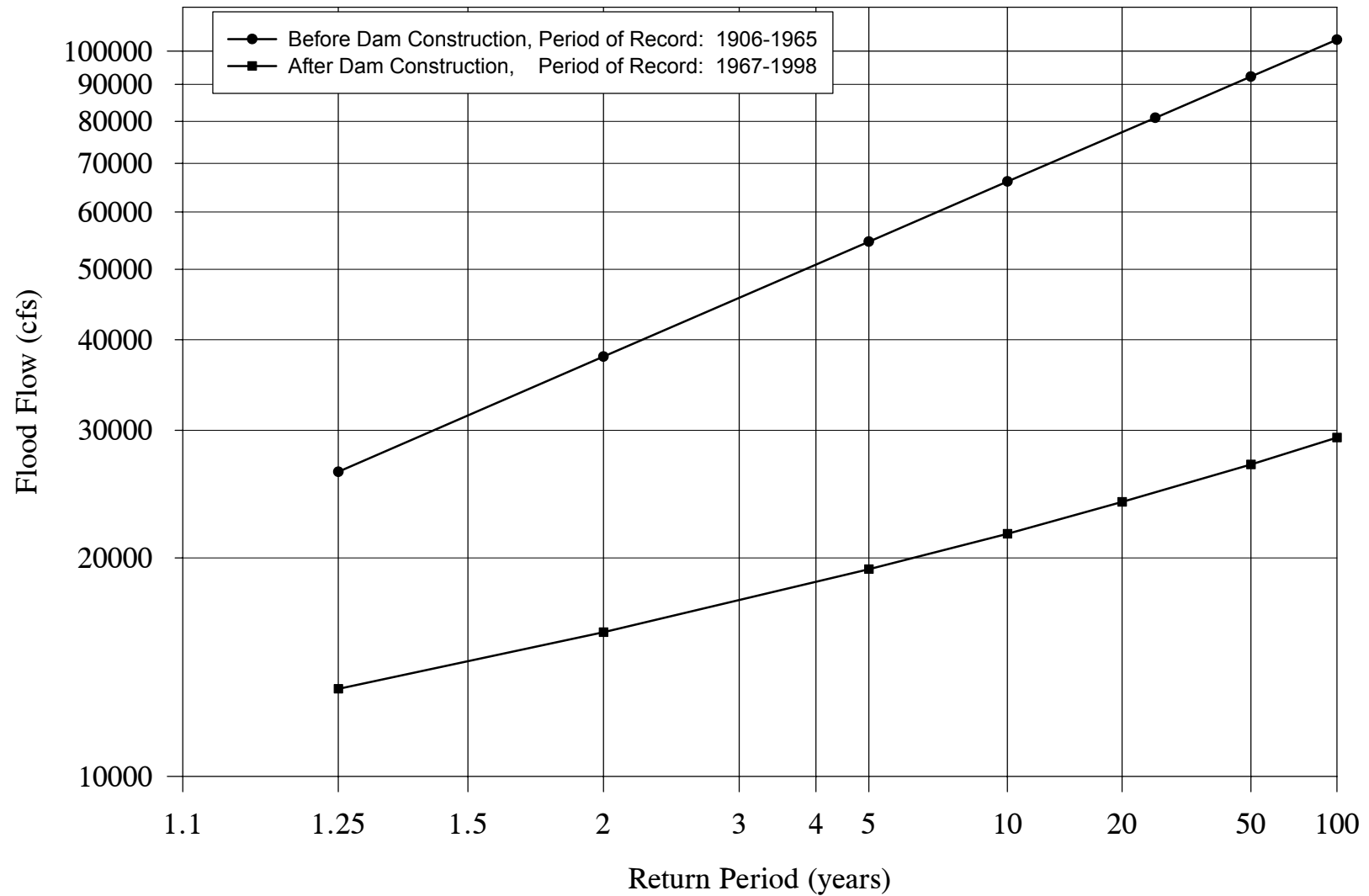


Figure F-37. Estimated flood-frequency relationship for USGS Gage No. 14187500 South Santiam River at Waterloo, Oregon.

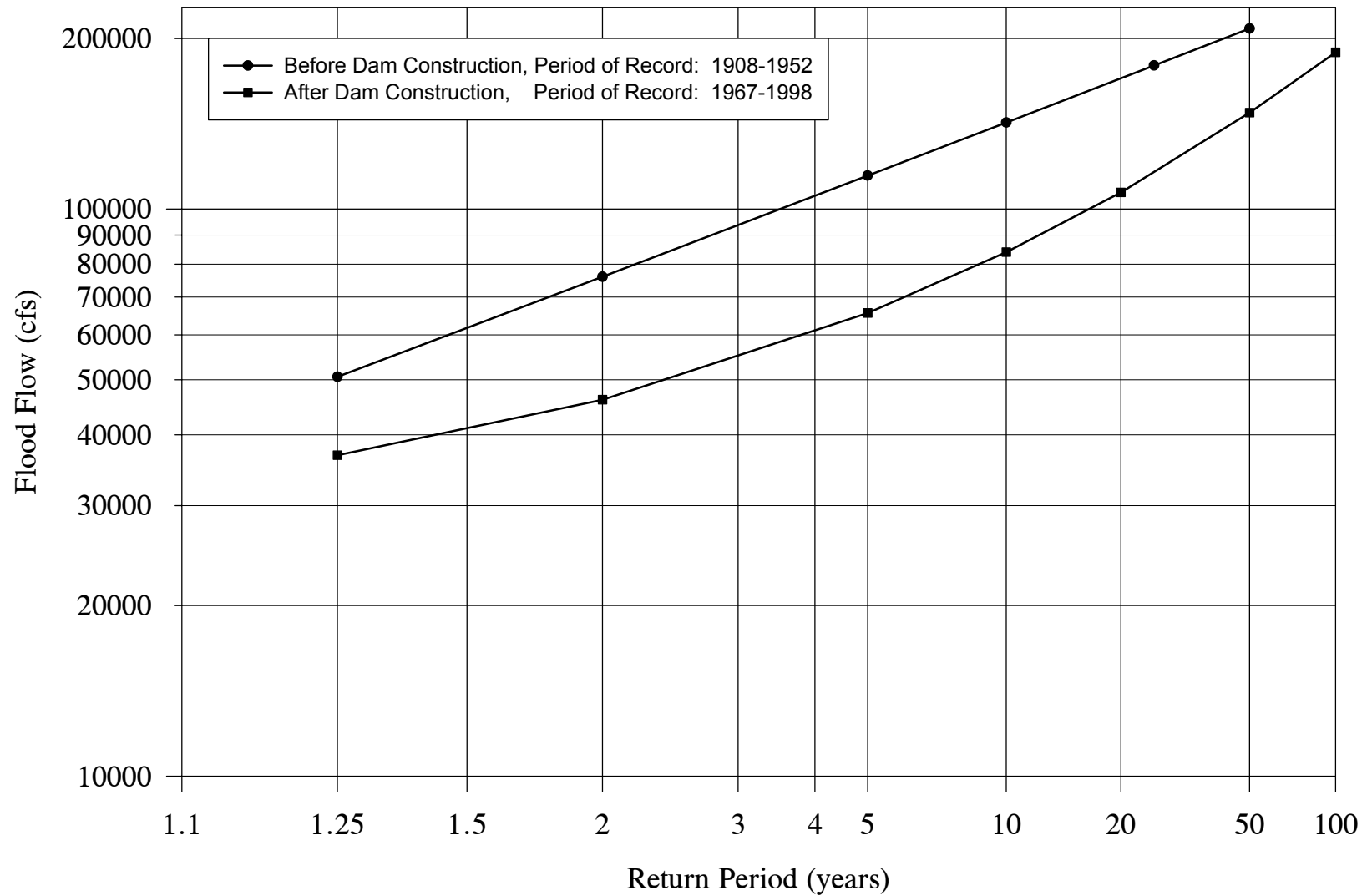


Figure F-38. Estimated flood-frequency relationship for USGS Gage No. 14189000 Santiam River at Jefferson, Oregon.

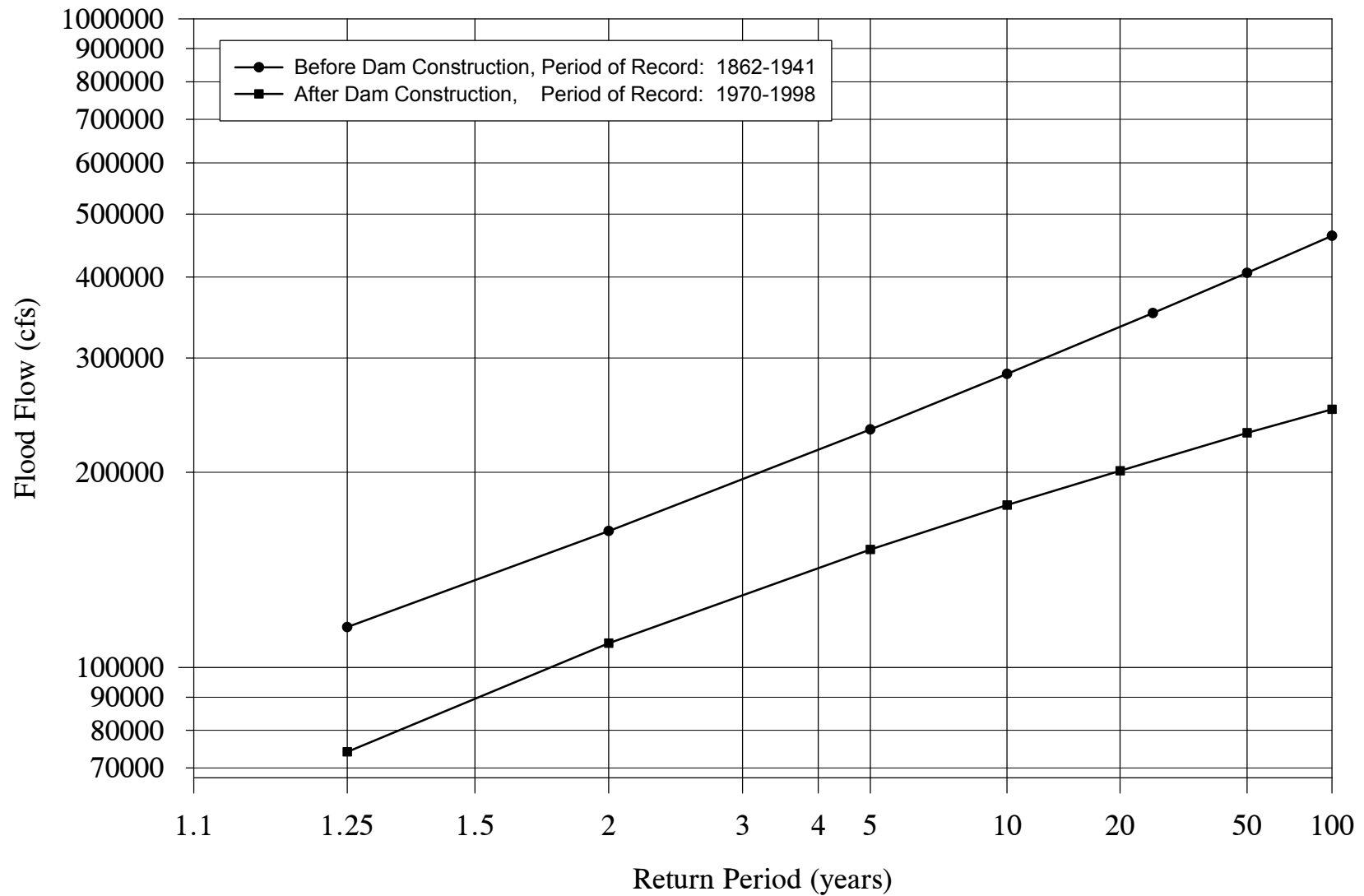


Figure F-39. Estimated flood-frequency relationship for USGS Gage No. 14191000 Willamette River at Salem, Oregon.

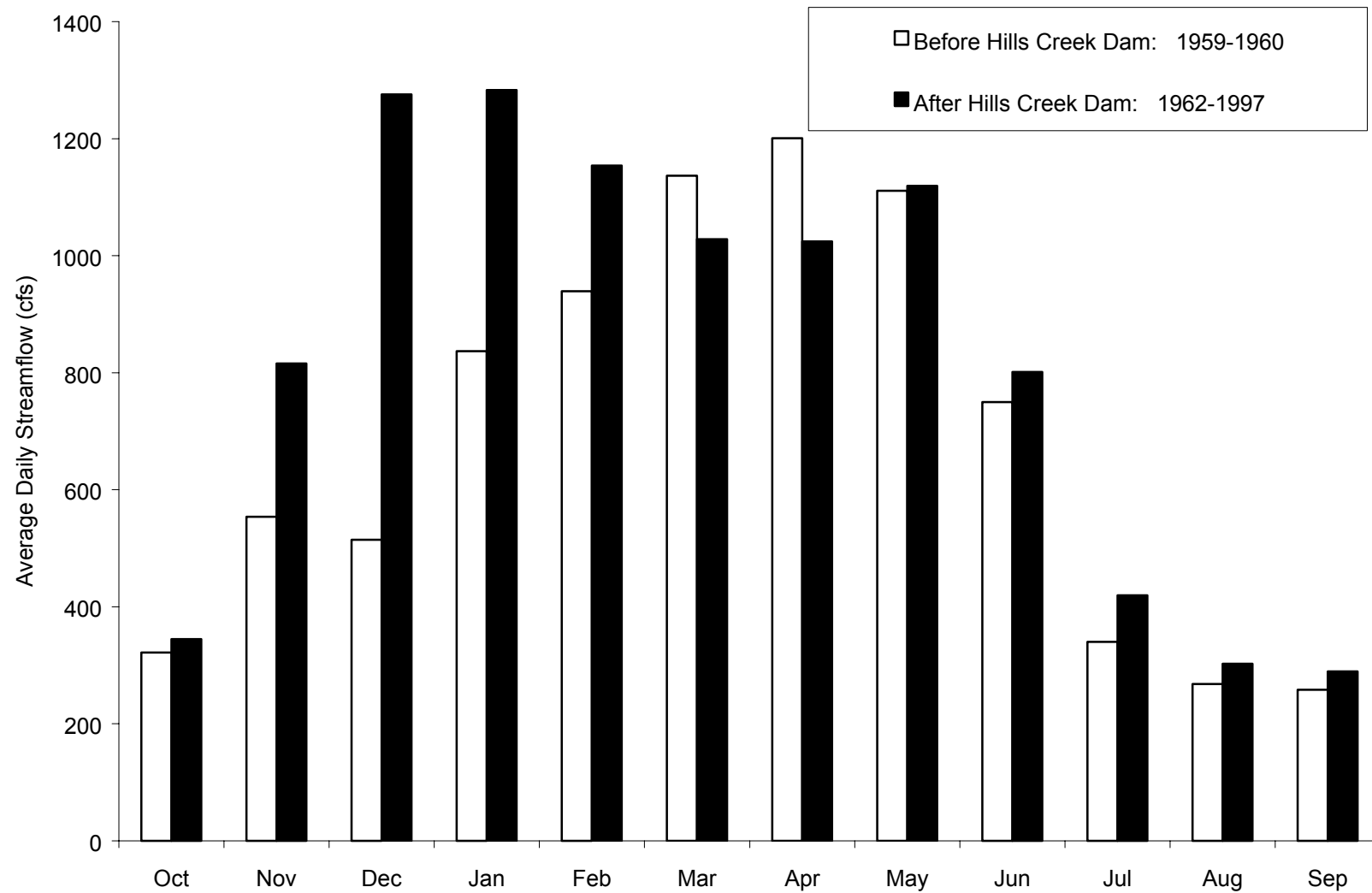


Figure F-40. Monthly Average Flows: USGS Gage: 14144800 Middle Fork Willamette River near Oakridge, Oregon, above Hills Creek Reservoir.

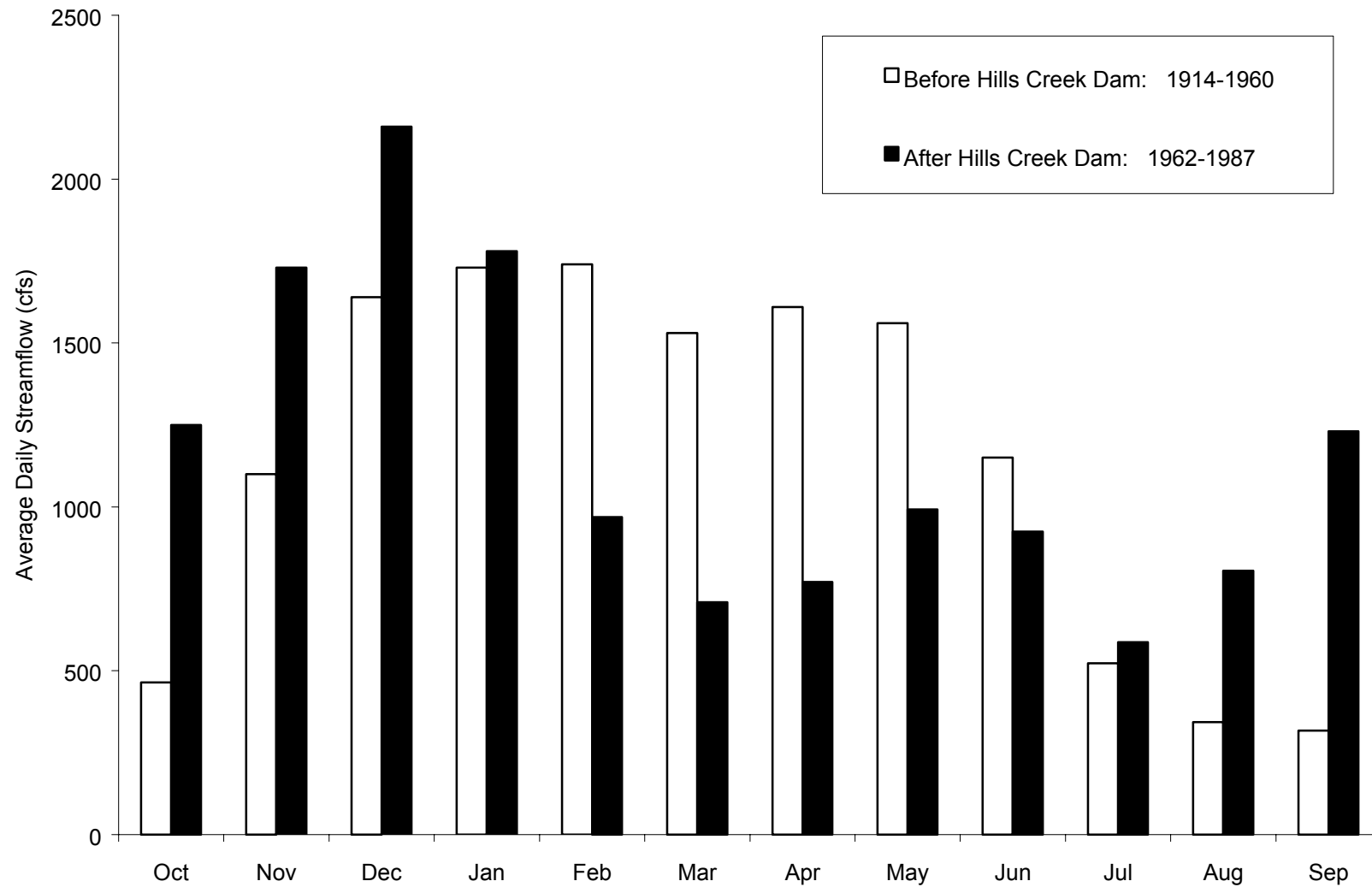


Figure F-41. Monthly Average Flows: USGS Gage: 141145500 Middle Fork Willamette River above Salt Creek near Oakridge Oregon, below Hills Creek Dam.

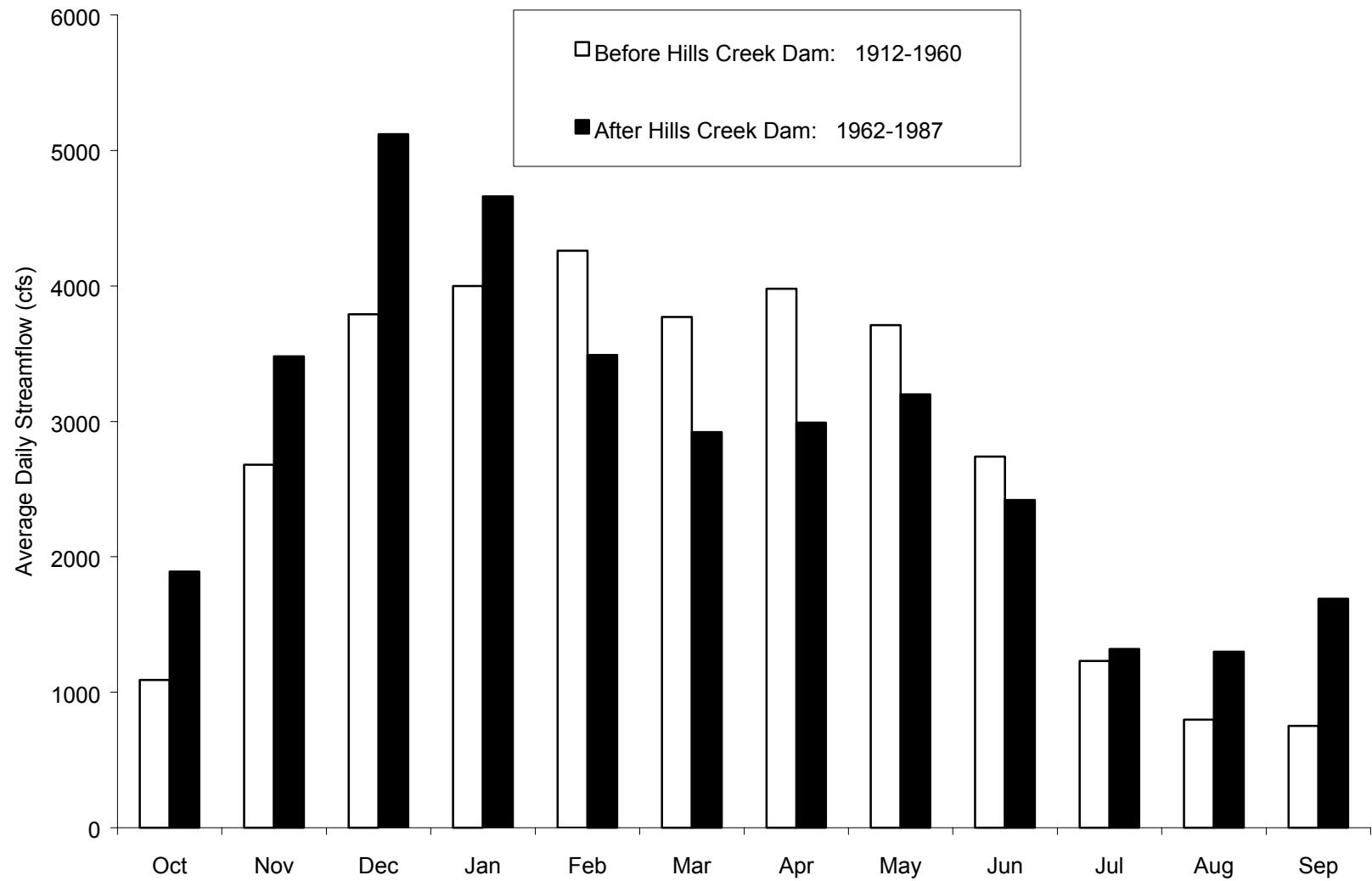


Figure F-42. Monthly Average Flows: USGS Gage: 14148000 Middle Fork Willamette River below North Fork, near Oakridge, Oregon, below Hills Creek Dam and above Lookout Point Reservoir.

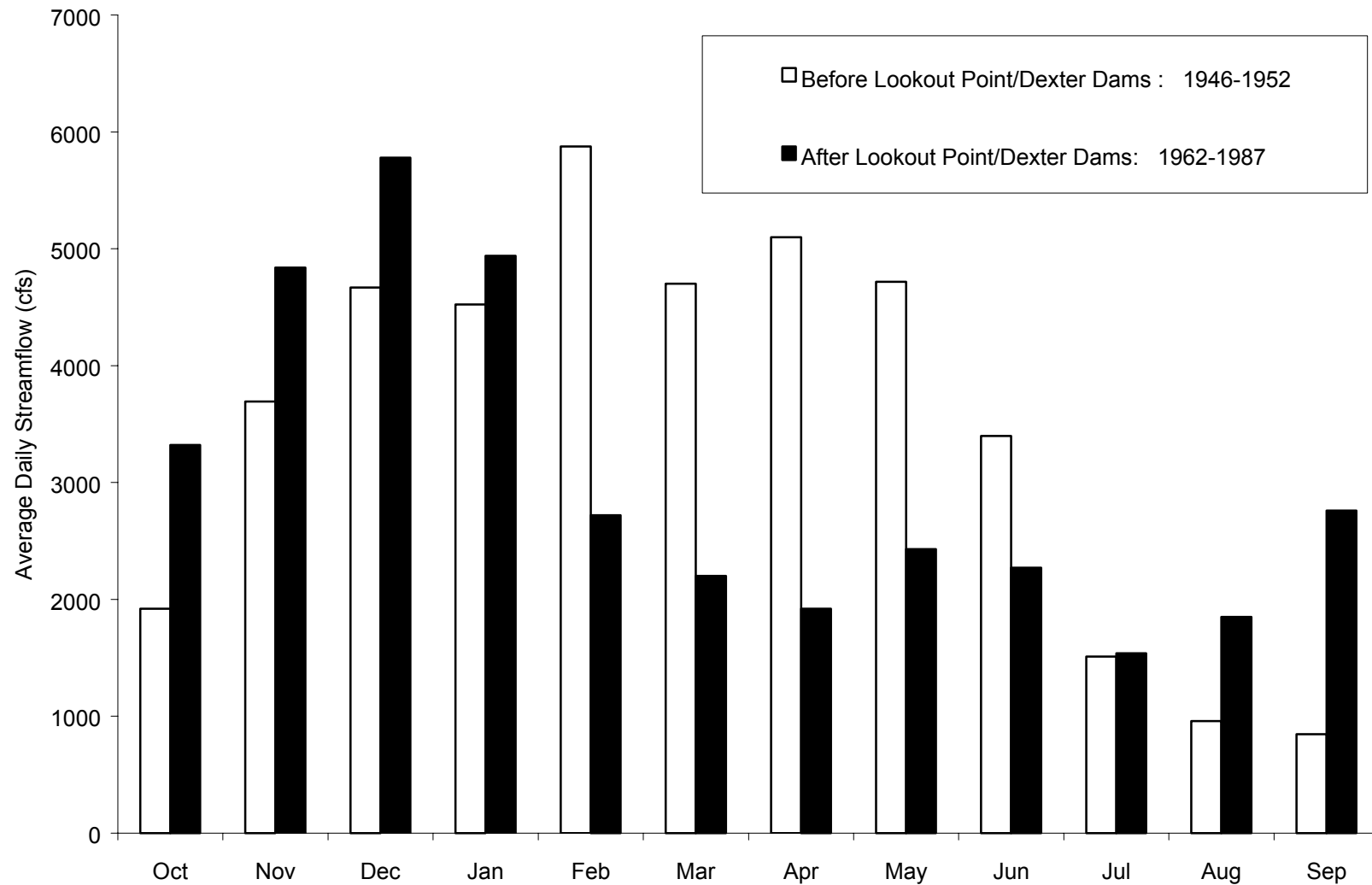


Figure F-43. Monthly Average Flows: USGS Gage: 14150000 Middle Fork Willamette River near Dexter, Oregon, below Dexter Dam.

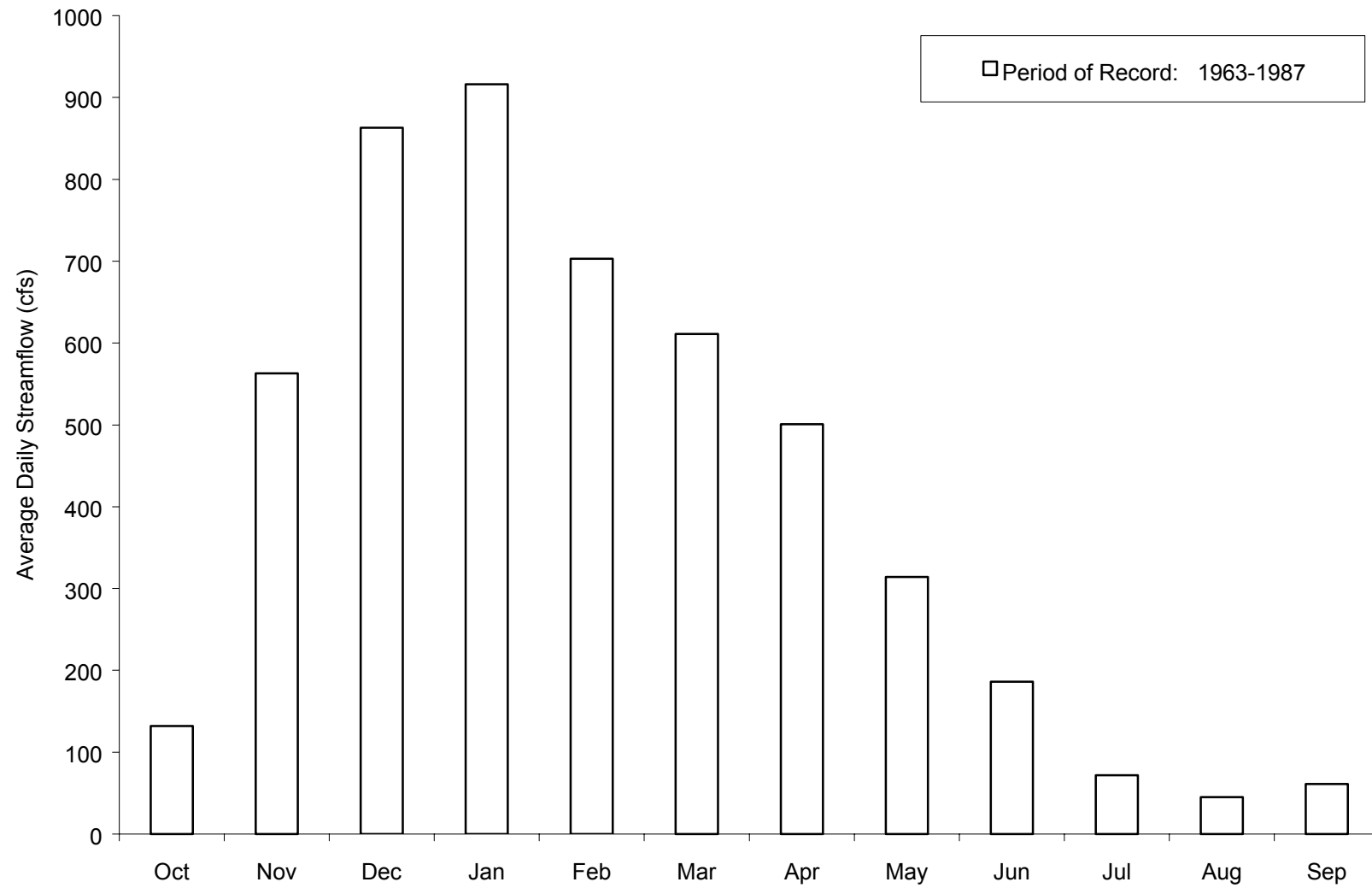


Figure F-44. Monthly Average Flows: USGS Gage: 14150300 Fall Creek near Lowell, Oregon, above Fall Creek Reservoir.

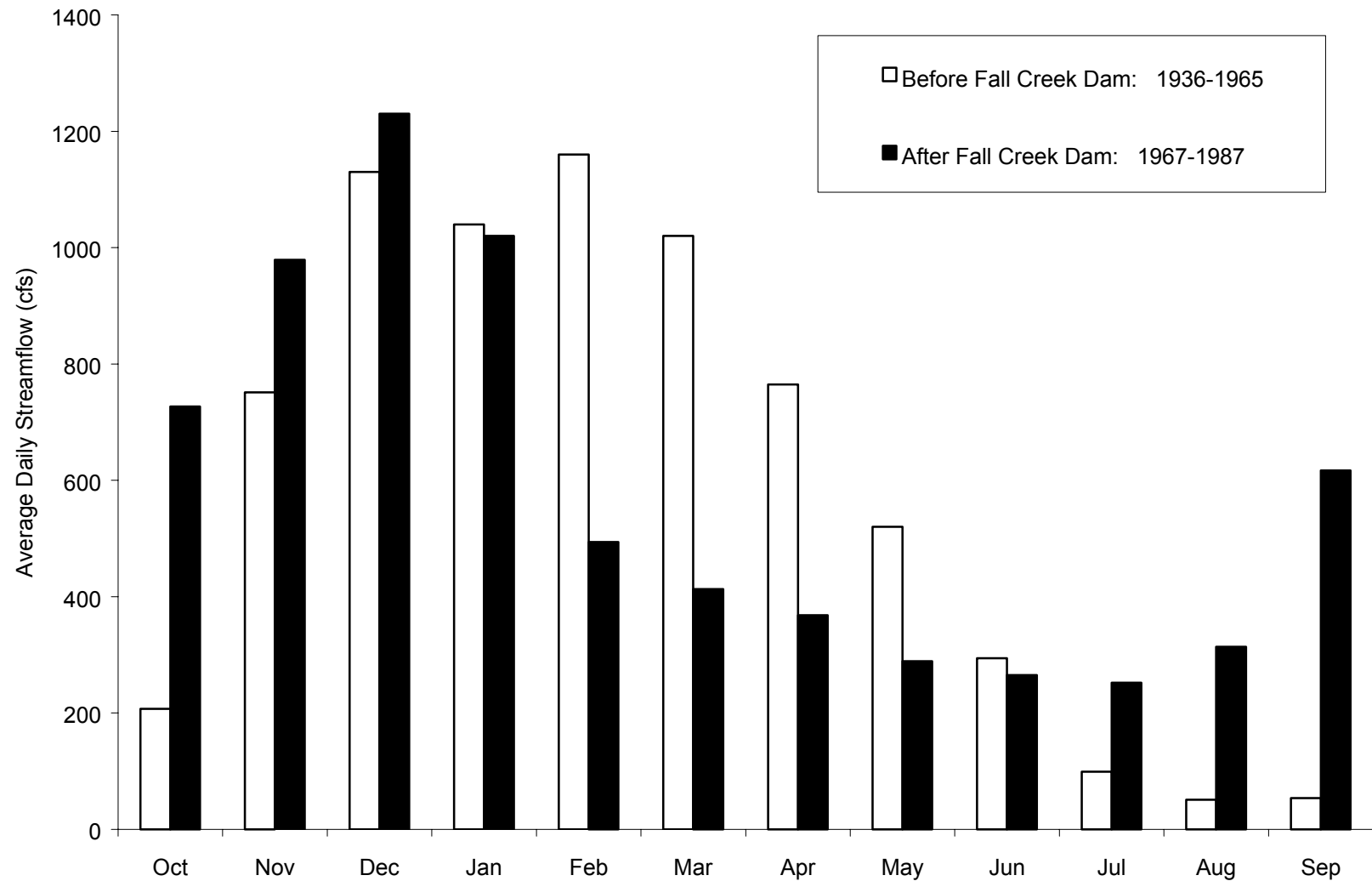


Figure F-45. Monthly Average Flows: USGS Gage: 14151000 Fall Creek below Winberry Creek near Fall Creek, Oregon, below Fall Creek Dam.

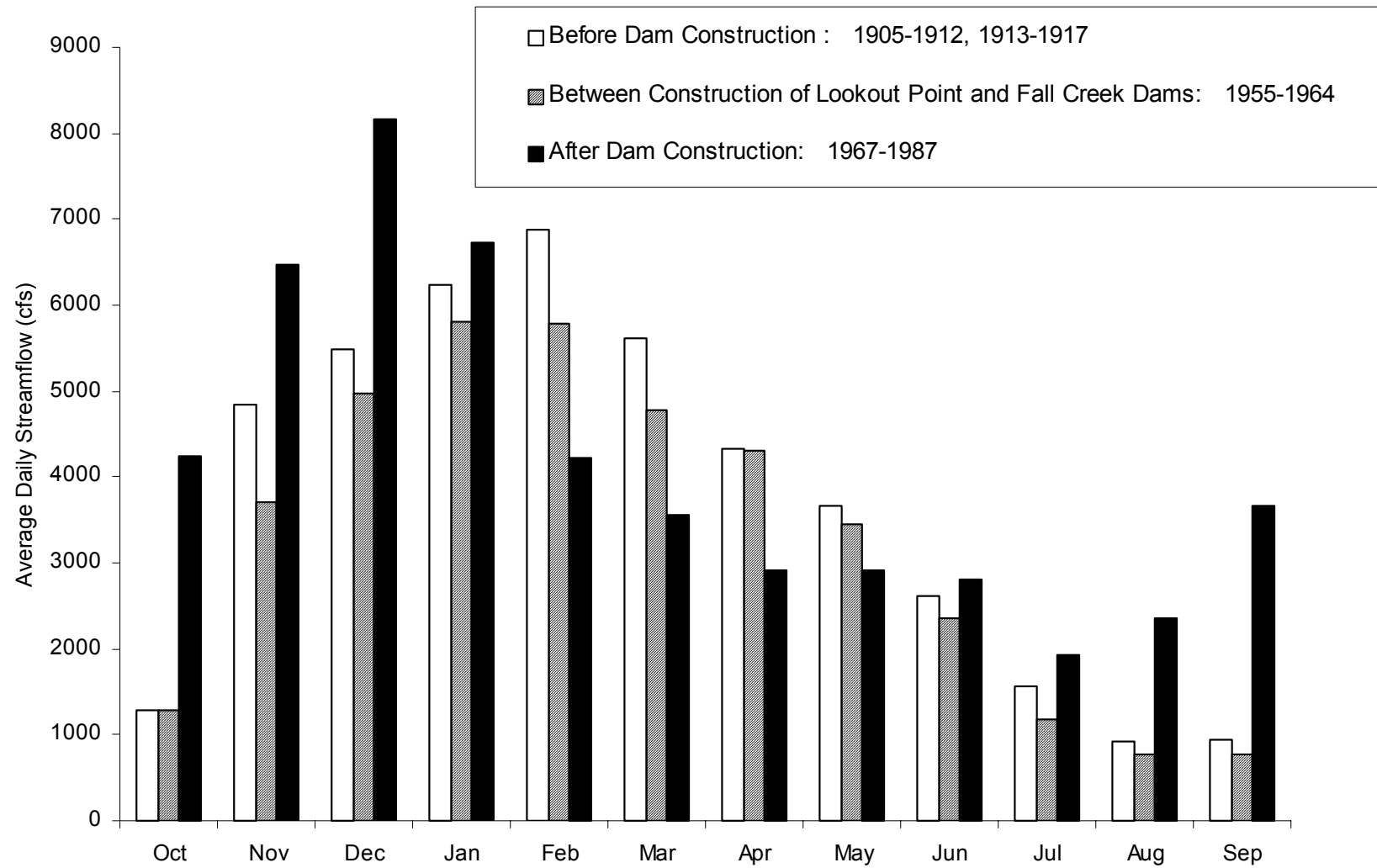


Figure F-46. Monthly Average Flows: USGS Gage: 14152000 Middle Fork Willamette River at Jasper, Oregon, below Fall Creek.

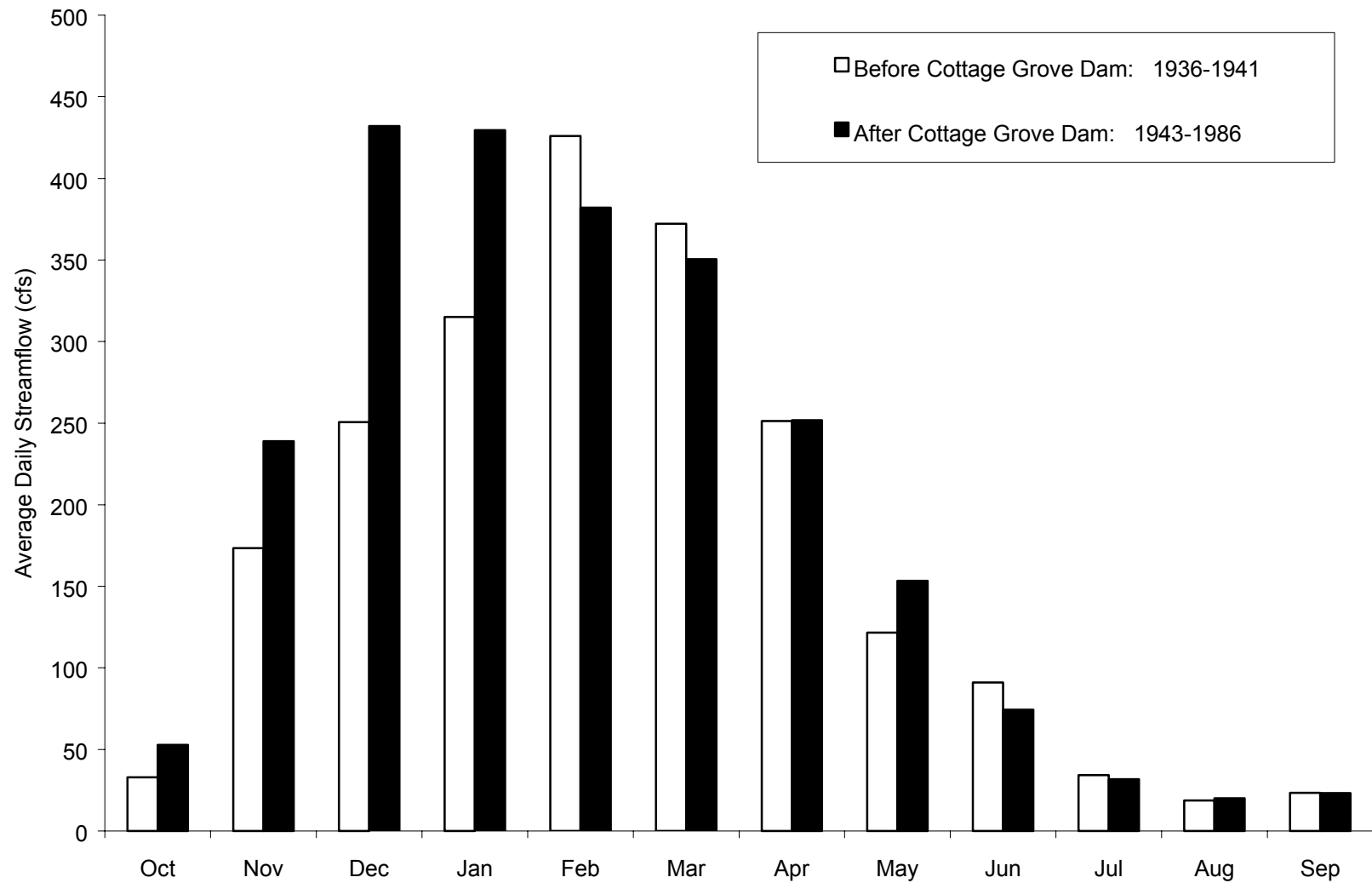


Figure F-47. Monthly Average Flows: USGS Gage: 14152500 Coast Fork Willamette River at London, Oregon, above Cottage Grove Reservoir.

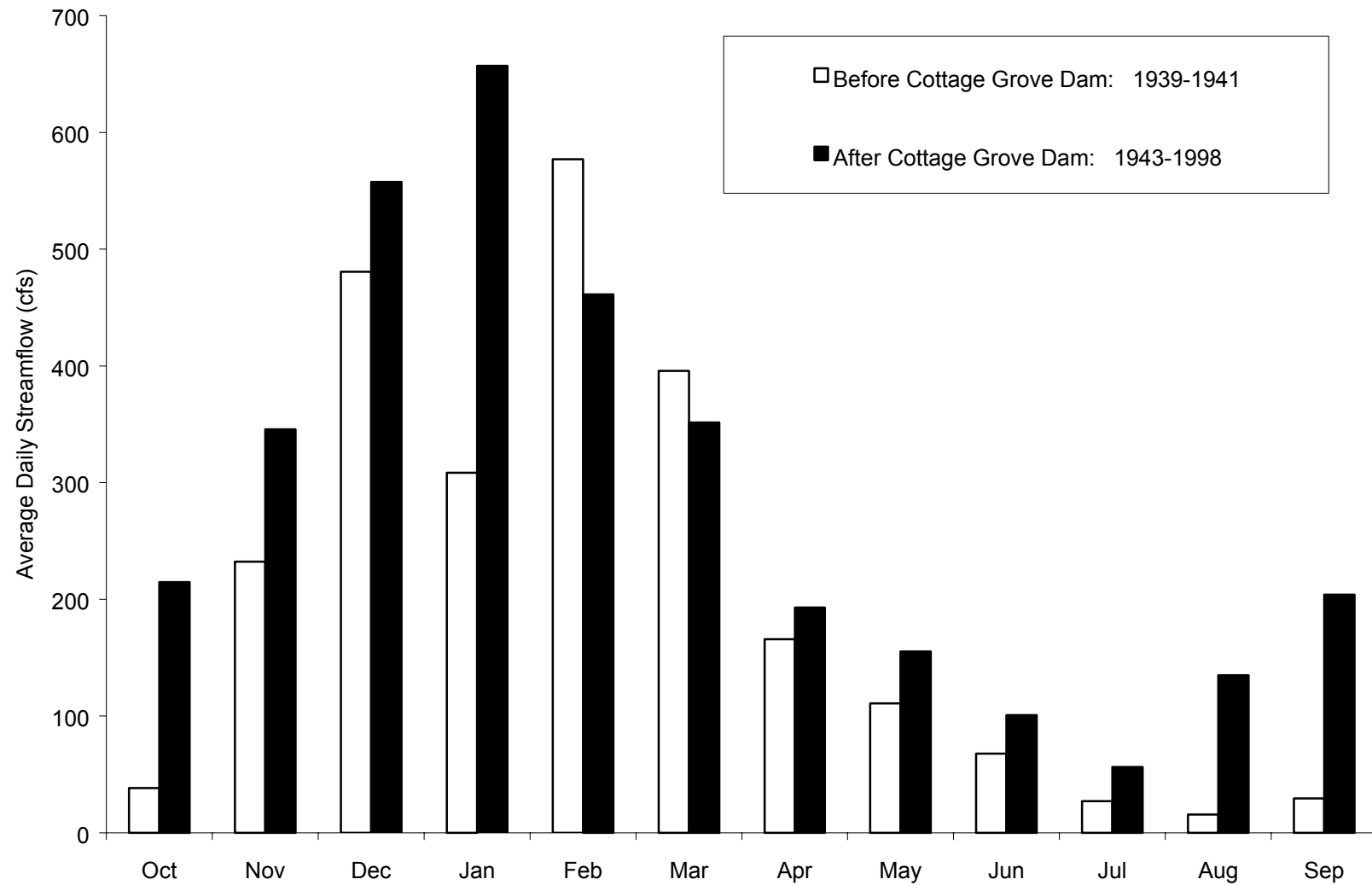


Figure F-48. Monthly Average Flows: USGS Gage: 14153500 Coast Fork Willamette River below Cottage Grove Dam, Oregon.

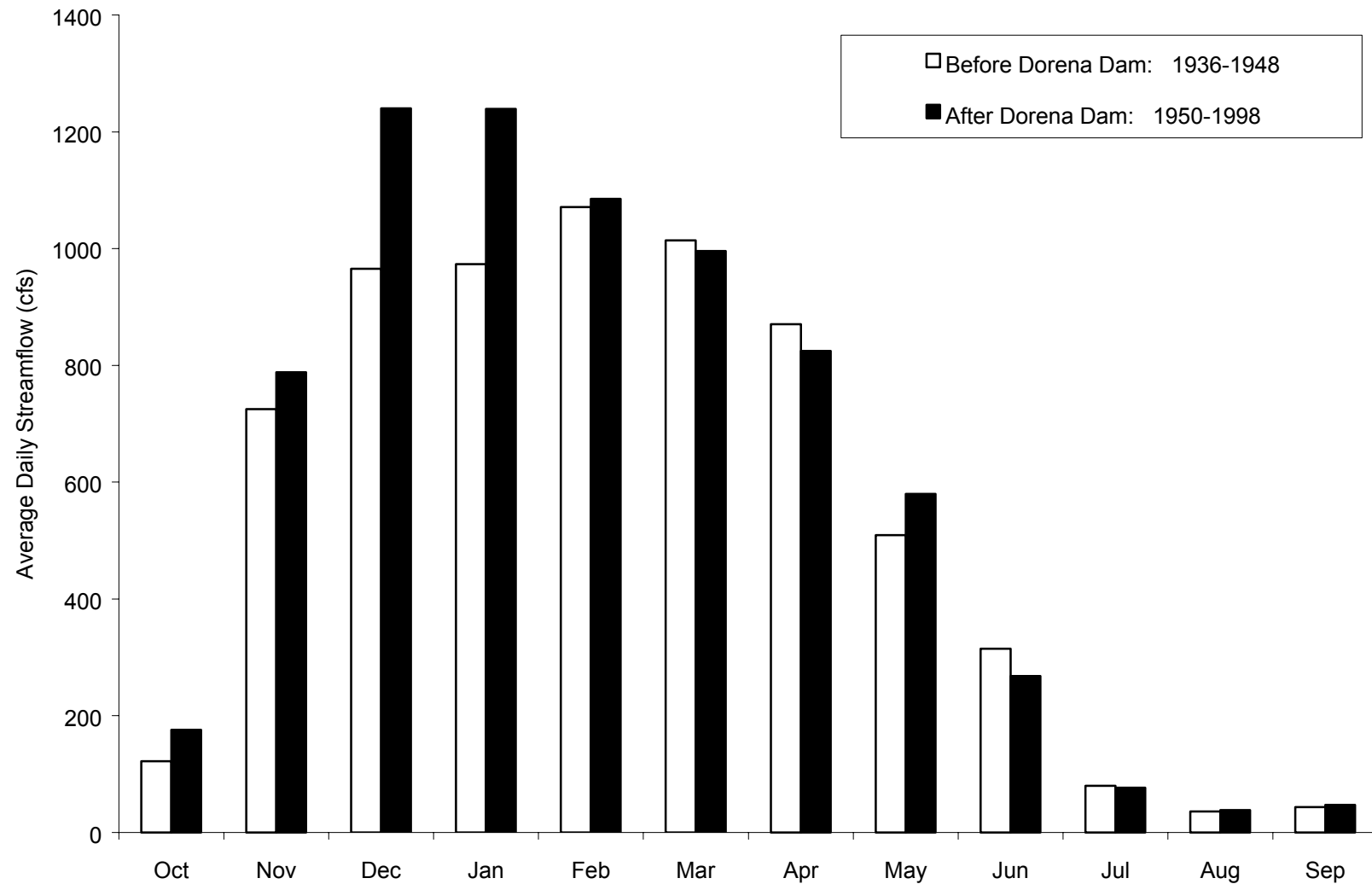


Figure F-49. Monthly Average Flows: USGS Gage: 14154500 Row River above Pitcher Creek, Near Dorena, Oregon, above Dorena Reservoir.

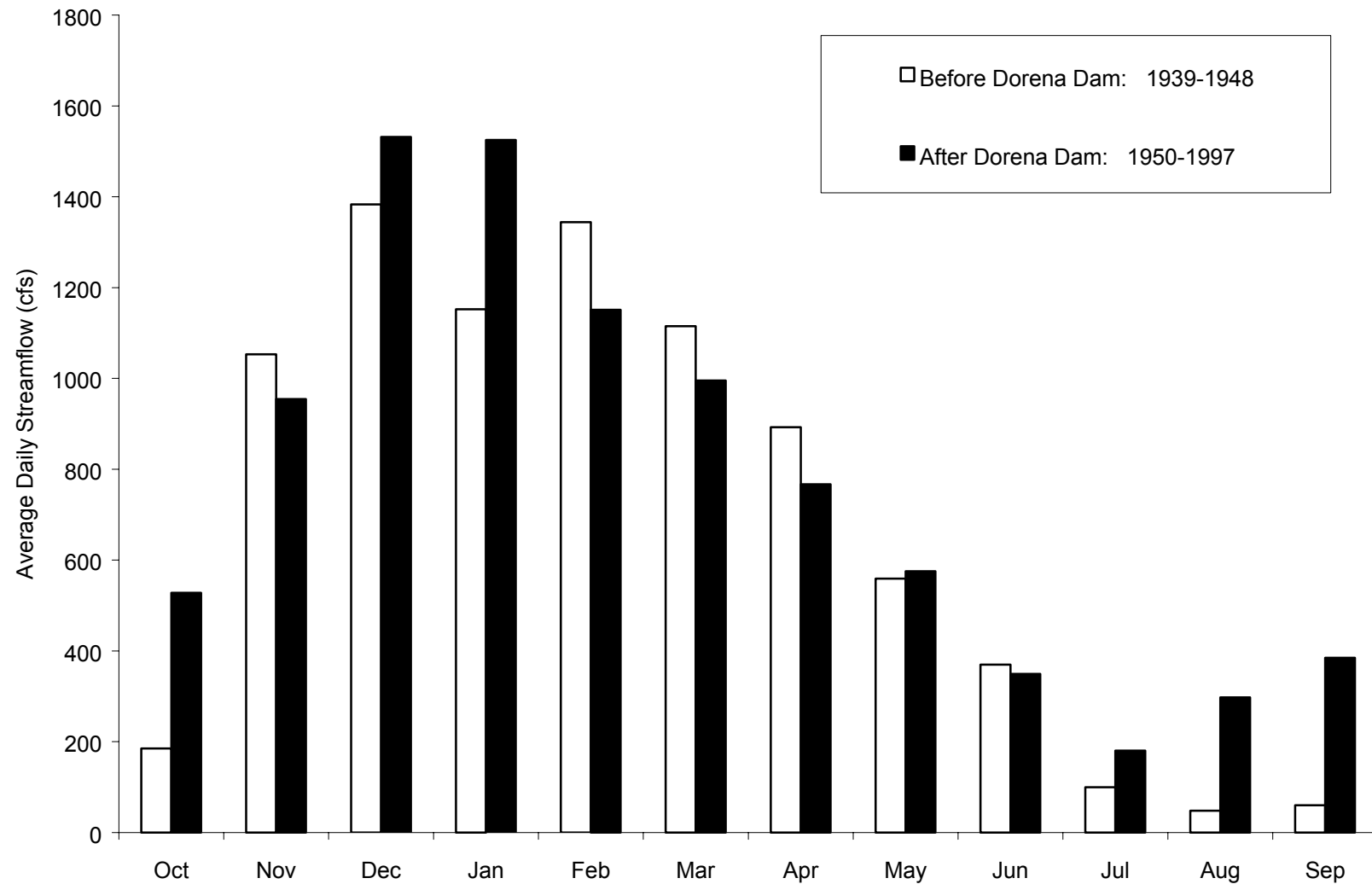


Figure F-50. Monthly Average Flows: USGS Gage: 14155500 Row River near Cottage Grove, Oregon, below Dorena Dam.

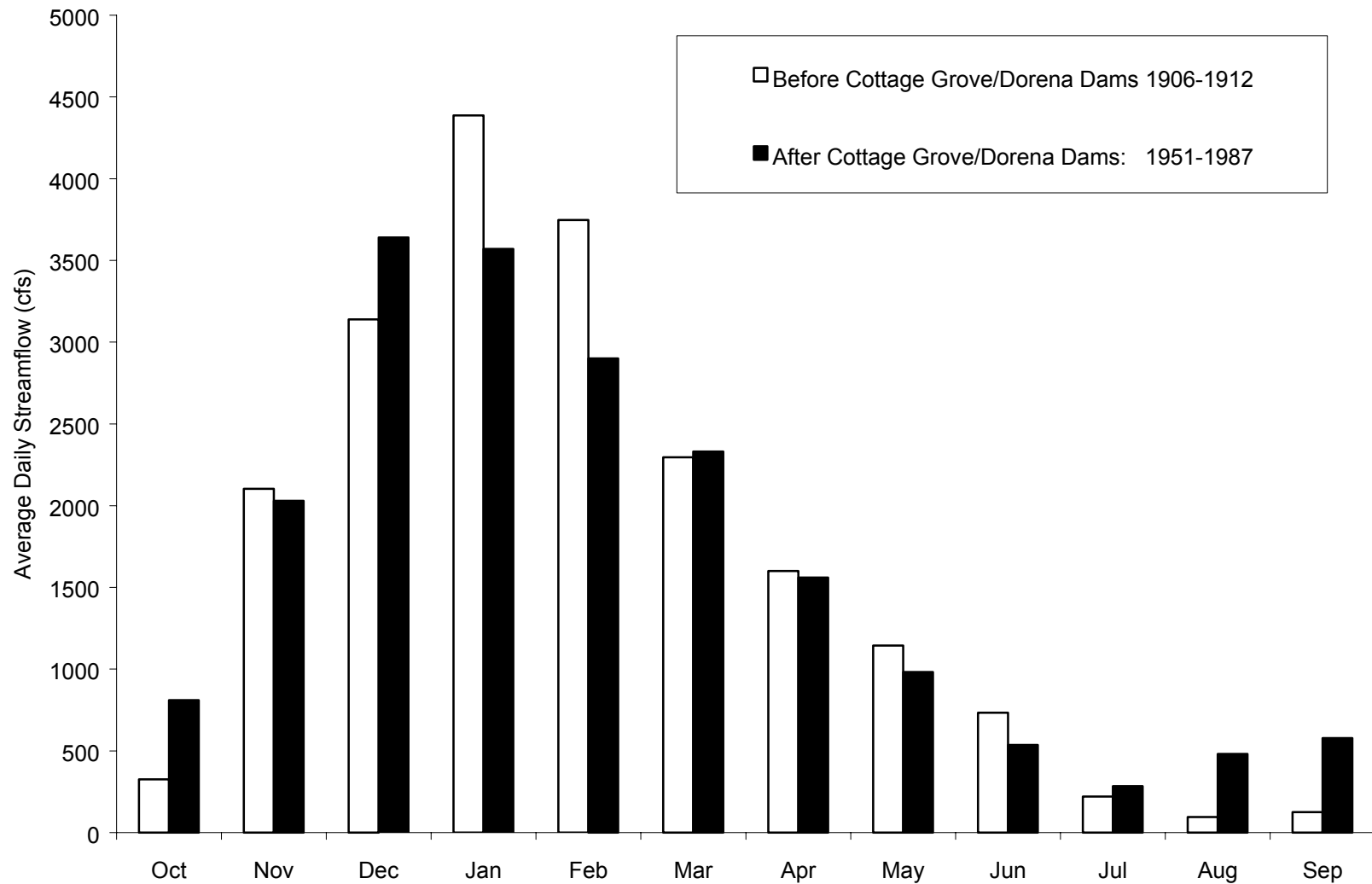


Figure F-51. Monthly Average Flows: USGS Gage: 14157500 Coast Fork Willamette River near Goshen, Oregon, below Cottage Grove and Dorena Dams.

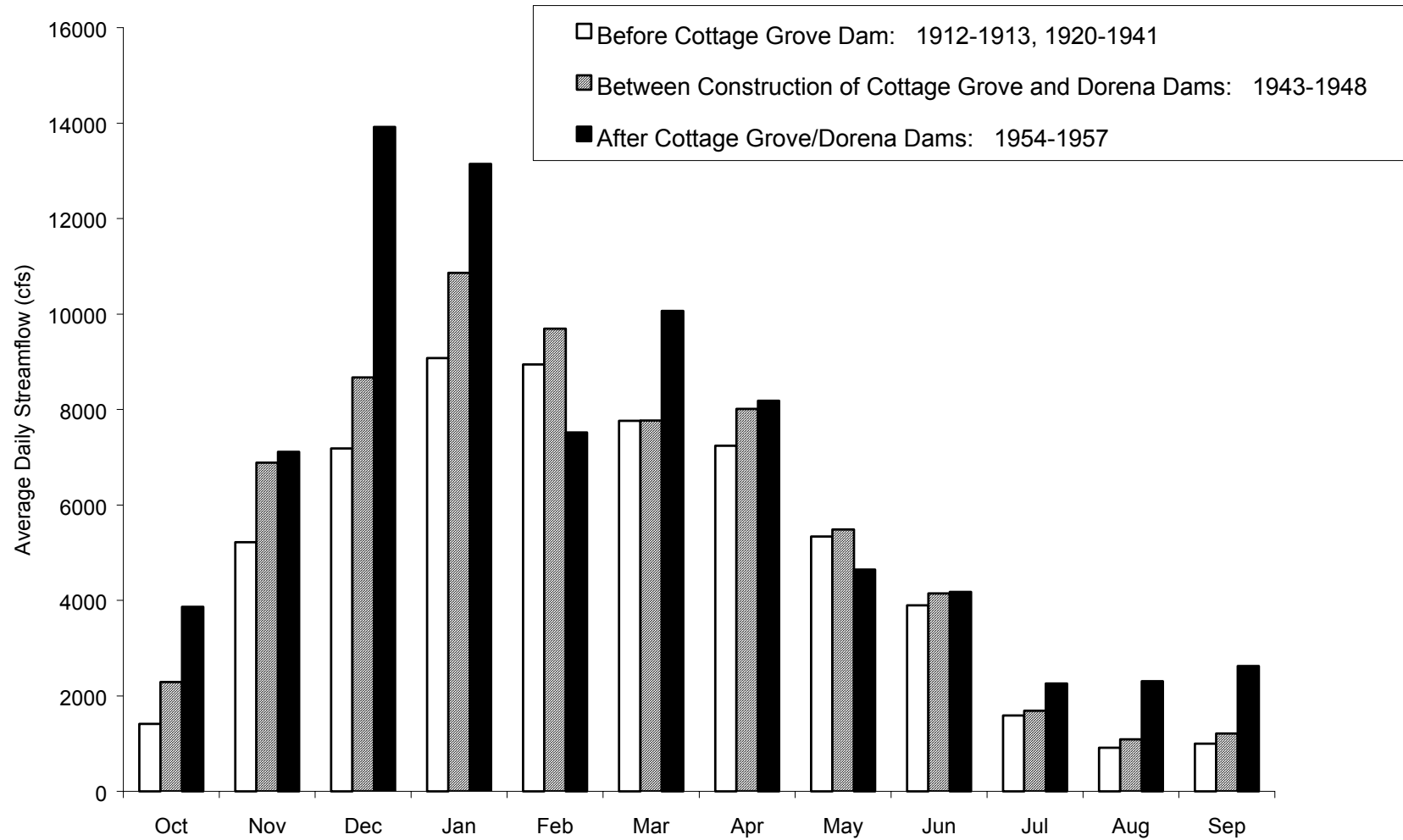


Figure F-52. Monthly Average Flows: USGS Gage: 14158000 Willamette River at Springfield, Oregon, between the Coast Fork Willamette and McKenzie Rivers.

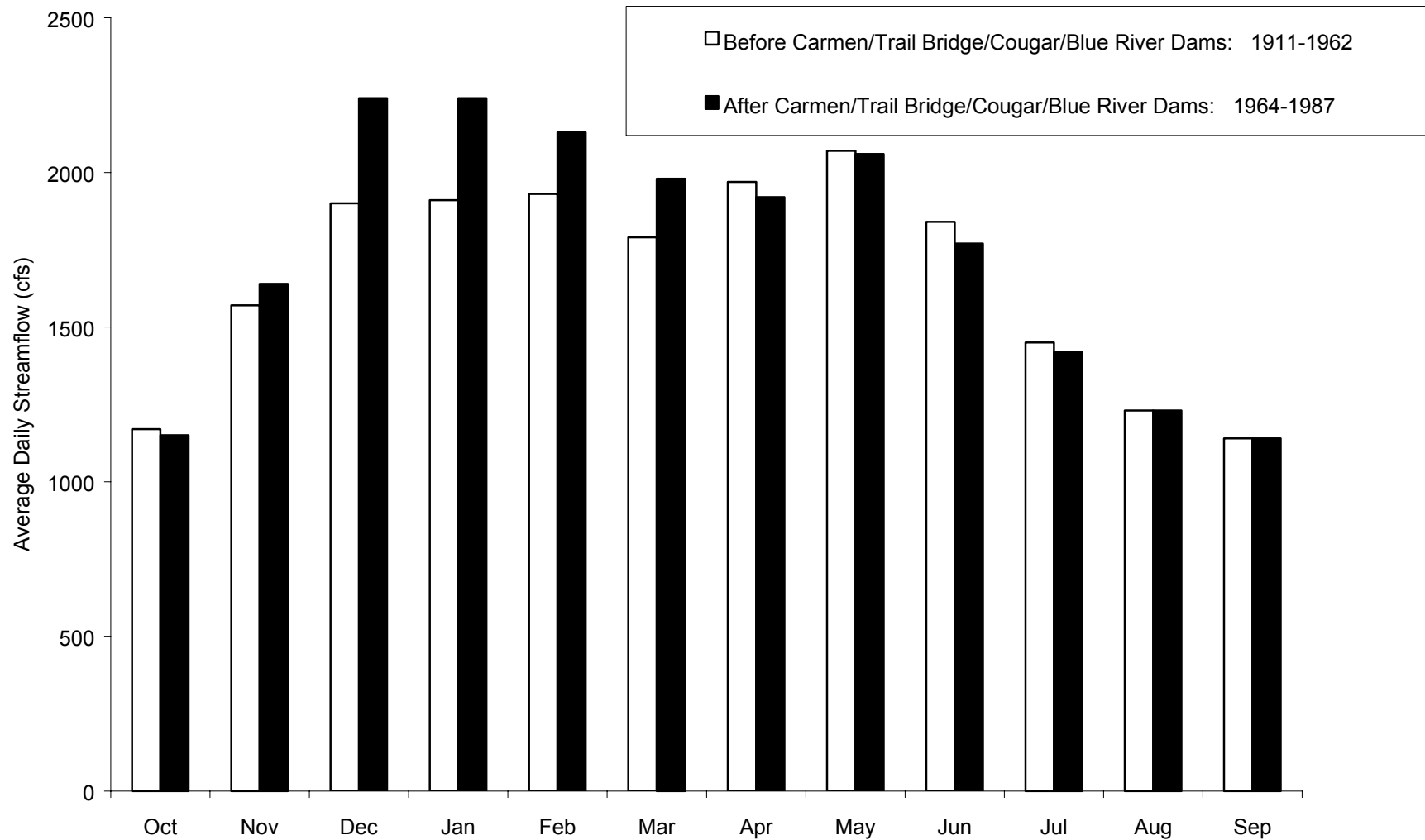


Figure F-53. Monthly Average Flows: USGS Gage: 14159000 McKenzie River at McKenzie Bridge, Oregon, above the South Fork McKenzie River.

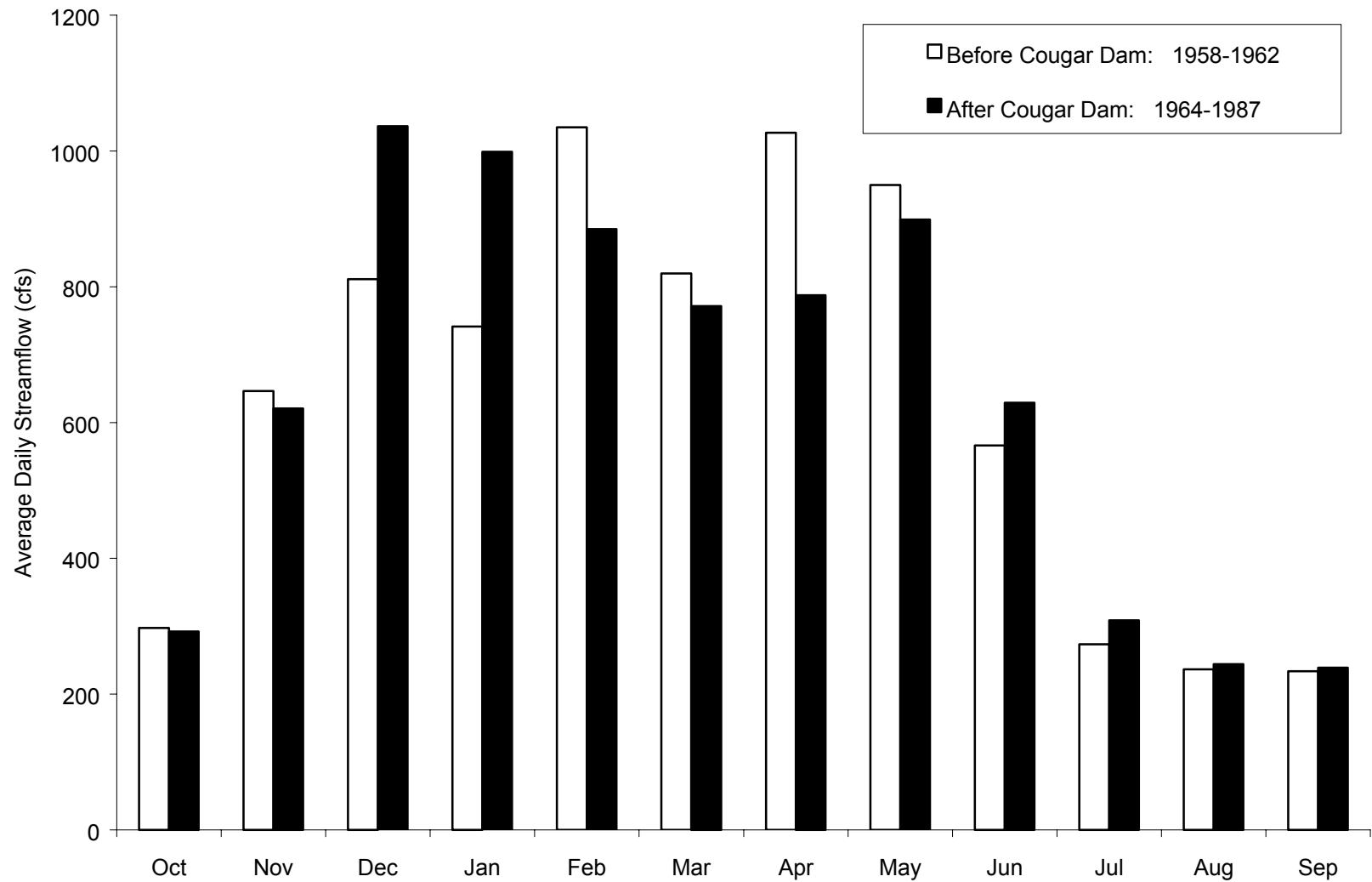


Figure F-54. Monthly Average Flows: USGS Gage: 14159200 South Fork McKenzie River above Cougar Lake near Rainbow, Oregon.

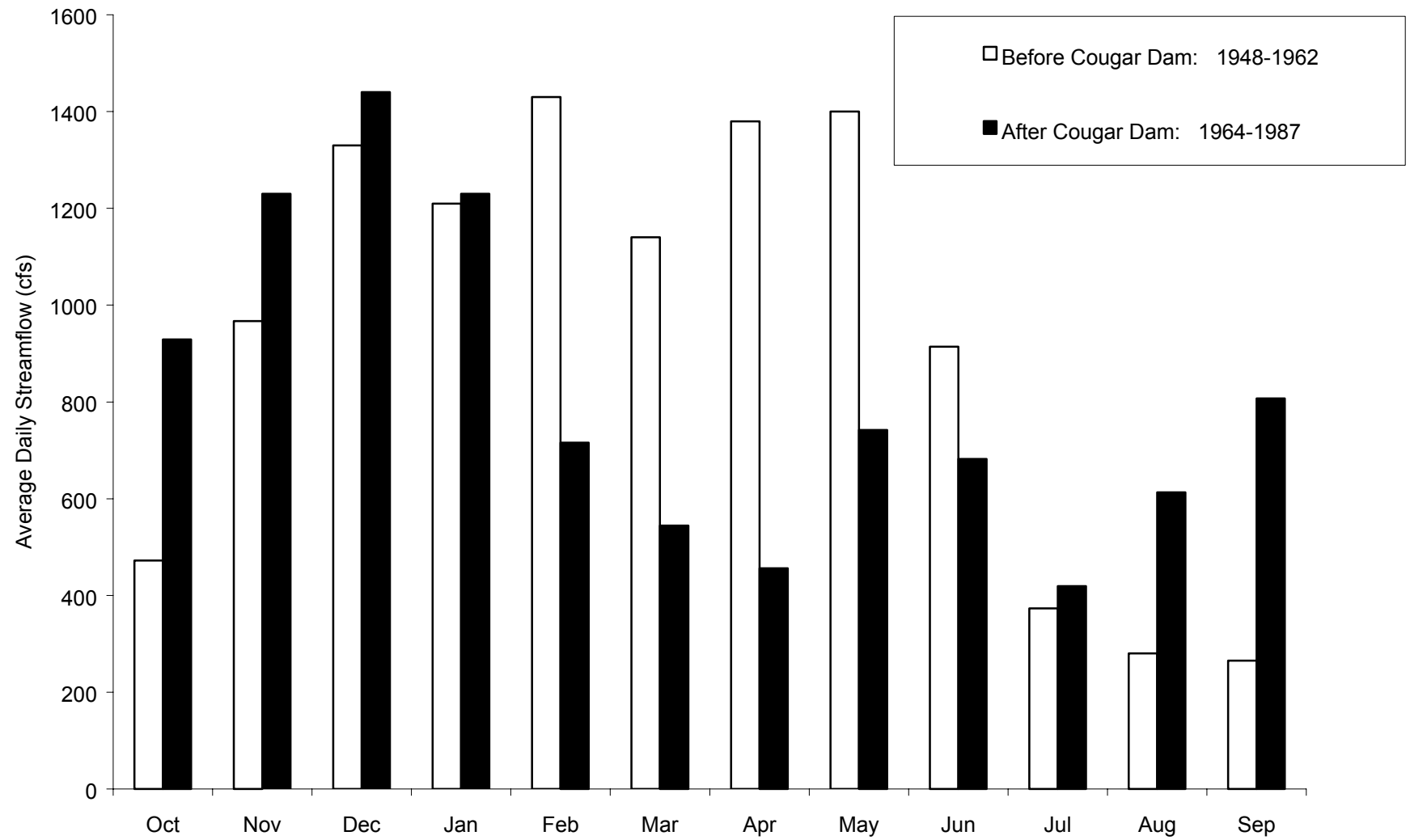


Figure F-55. Monthly Average Flows: USGS Gage: 14159500 South Fork McKenzie River near Rainbow, Oregon, below Cougar Dam.

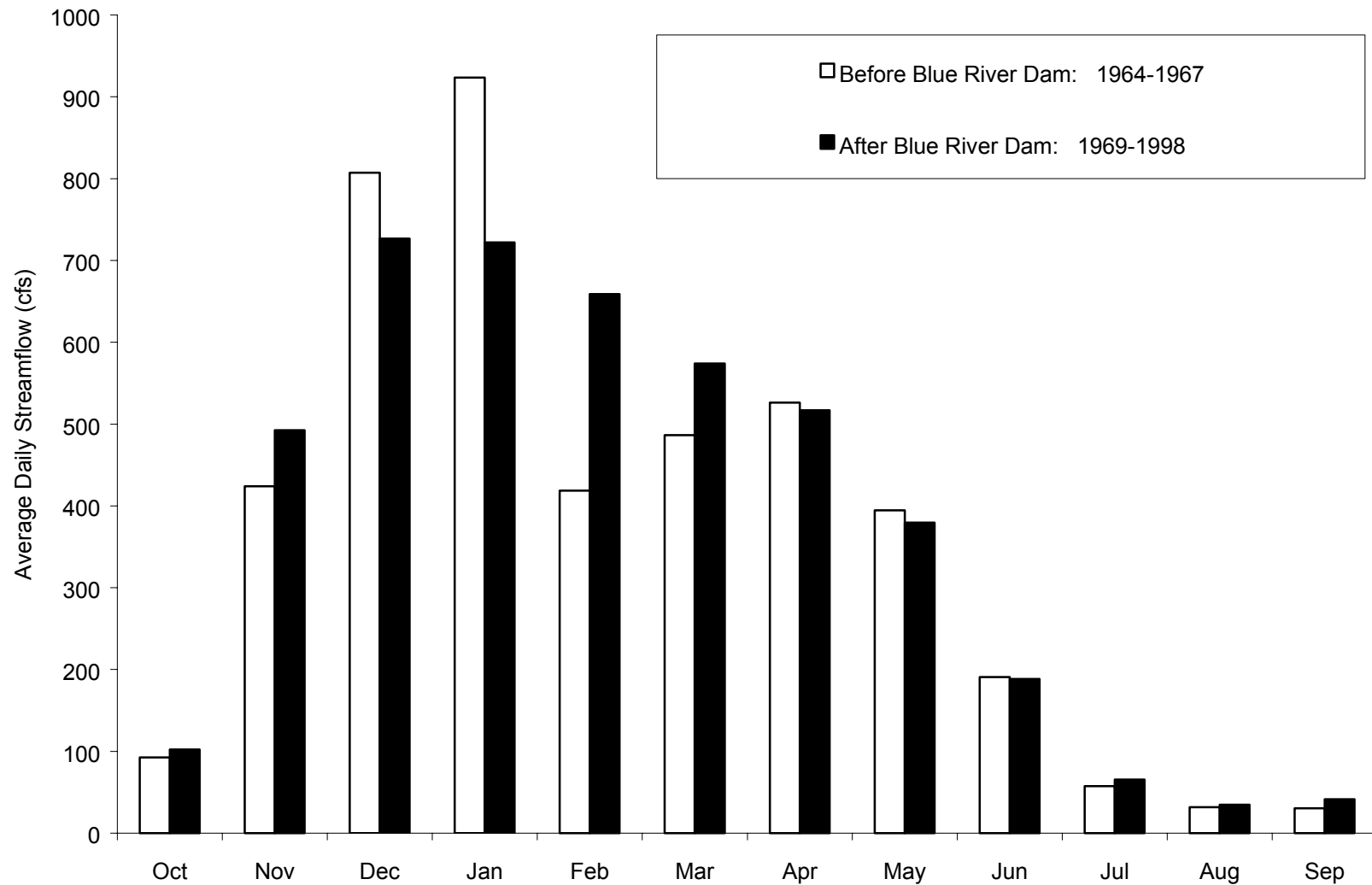


Figure F-56. Monthly Average Combined Flows: USGS Gage: 14161100 Blue River below Tidbits Creek near Blue River, Oregon and USGS Gage: 14161500 Lookout Creek near Blue River, Oregon.

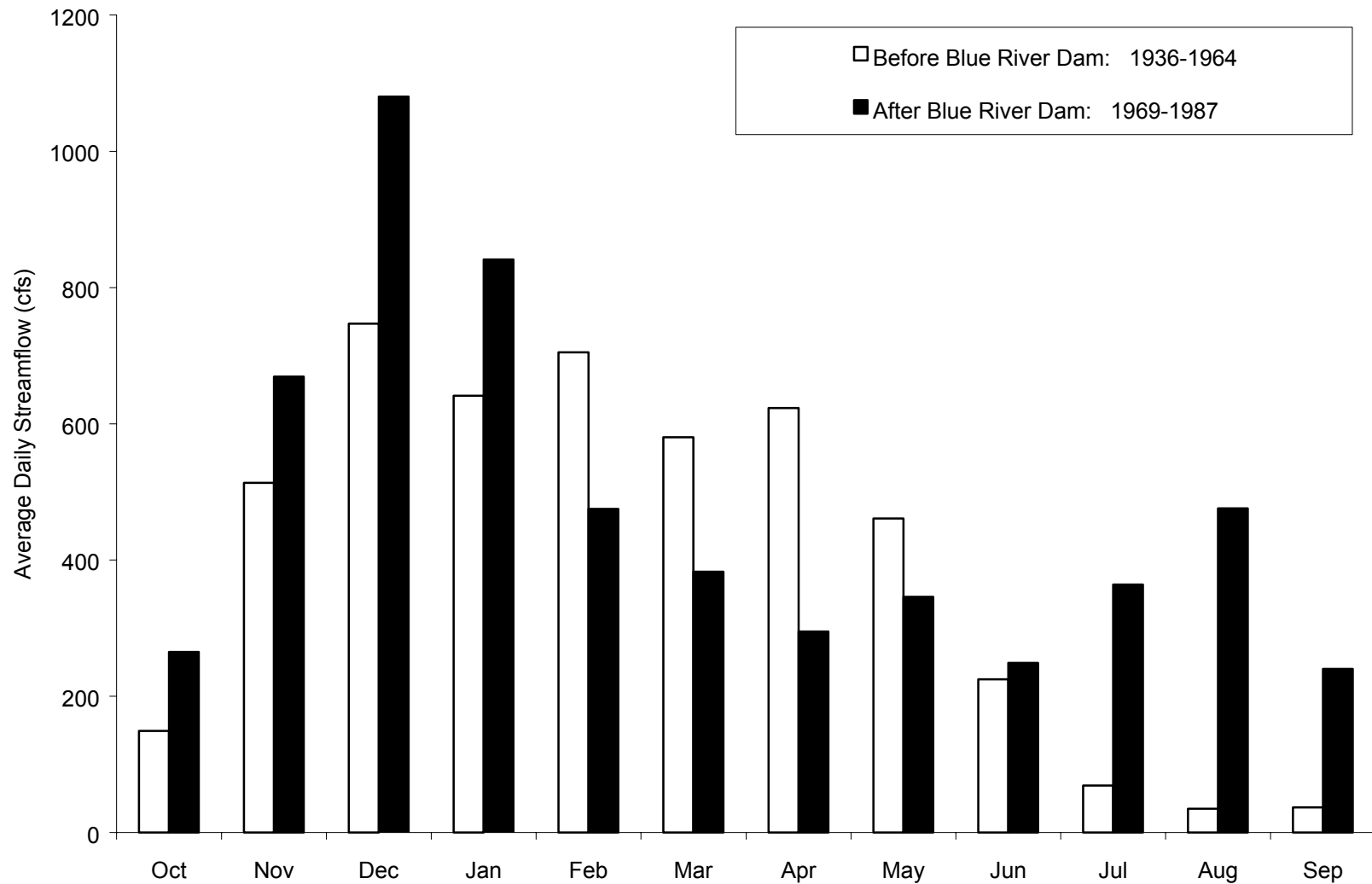


Figure F-57. Monthly Average Flows: USGS Gage: 14162000 Blue River near Blue River, Oregon (1936-1974) and 14162200 Blue River at Blue River, Oregon (1969-1987), below Blue River.

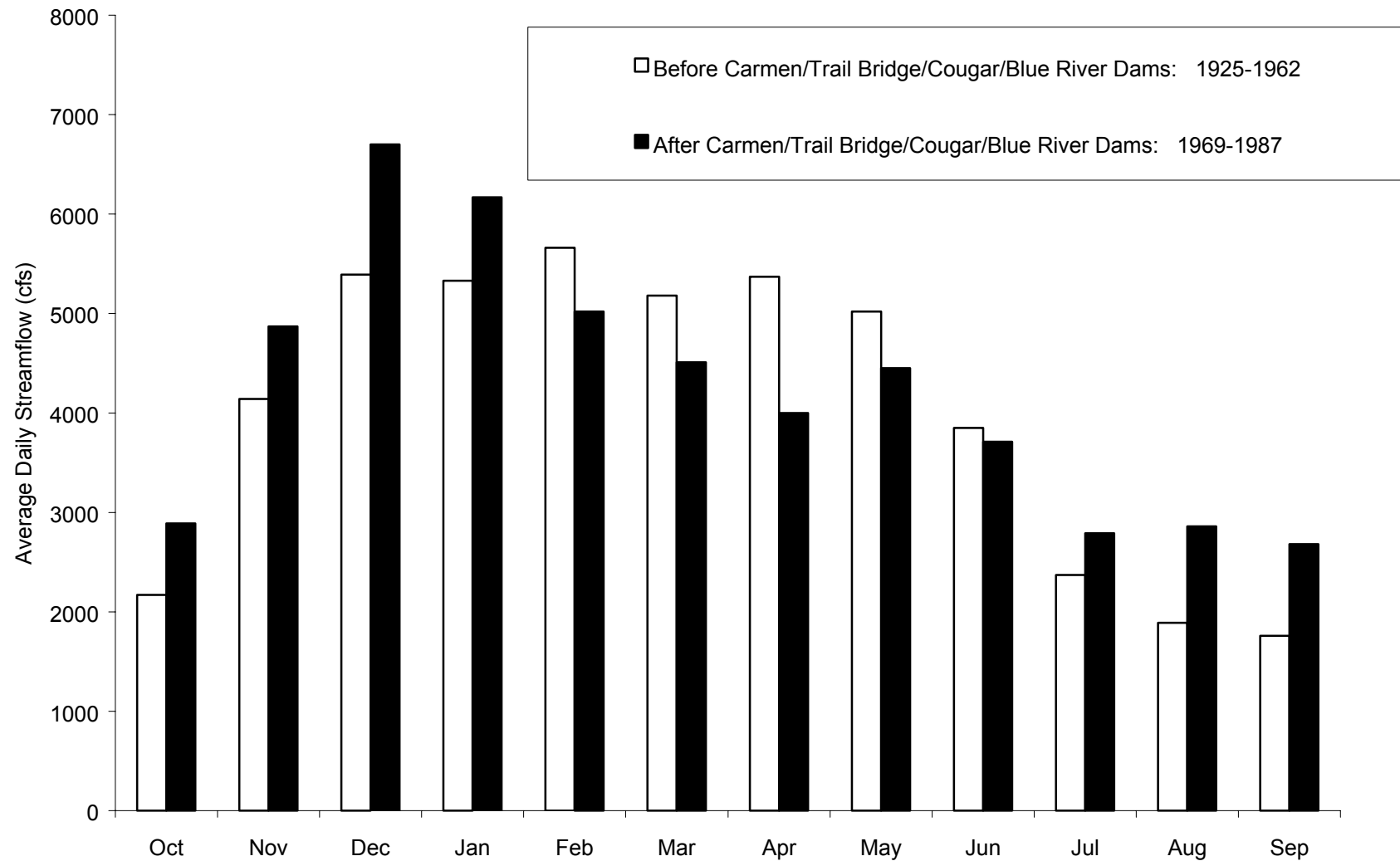


Figure F-58. Monthly Average Flows: USGS Gage: 14162500 McKenzie River near Vida, Oregon, above Blue River.

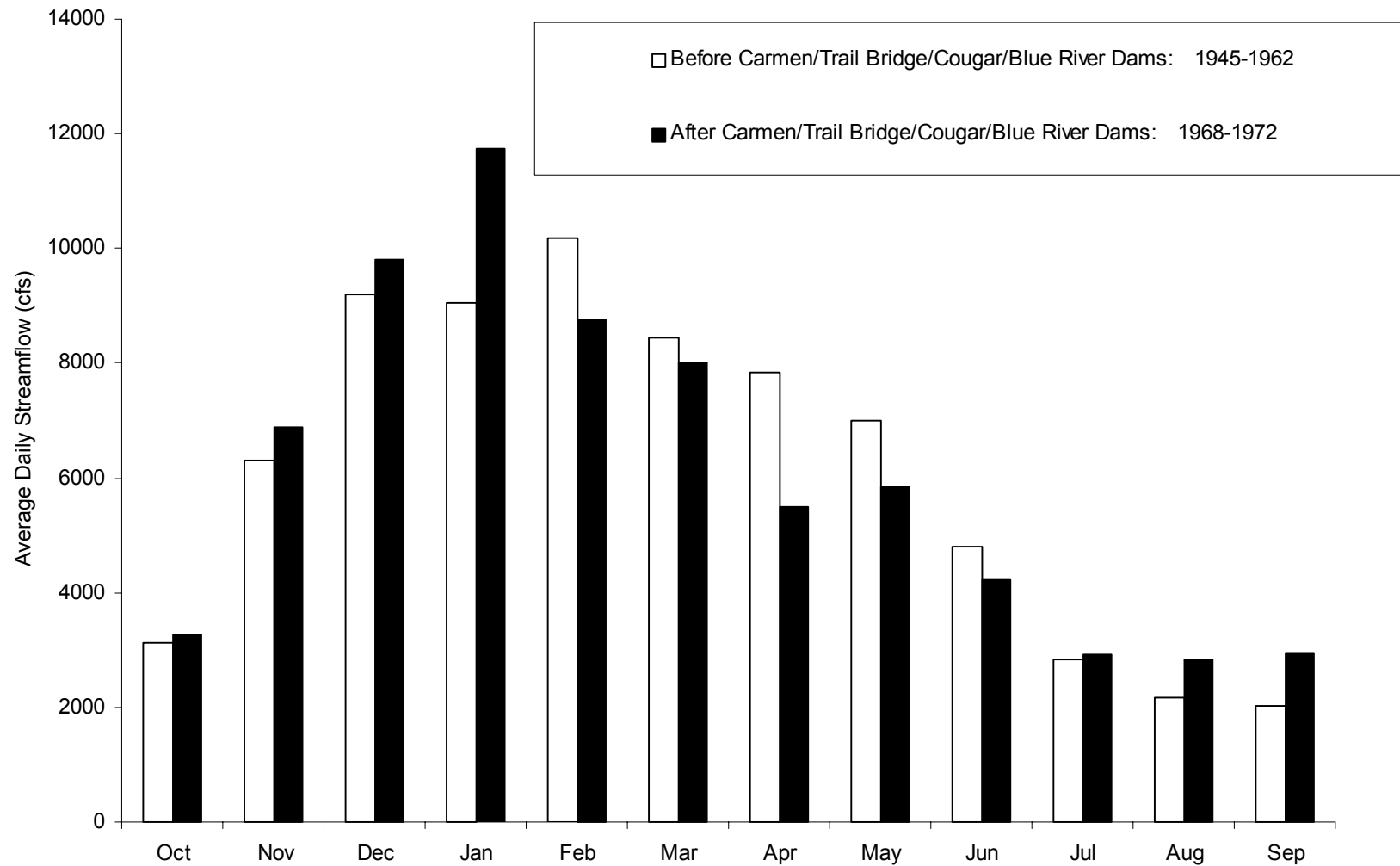


Figure F-59. Monthly Average Flows: USGS Gage: 14165500 McKenzie River near Coburg, Oregon, near mouth.

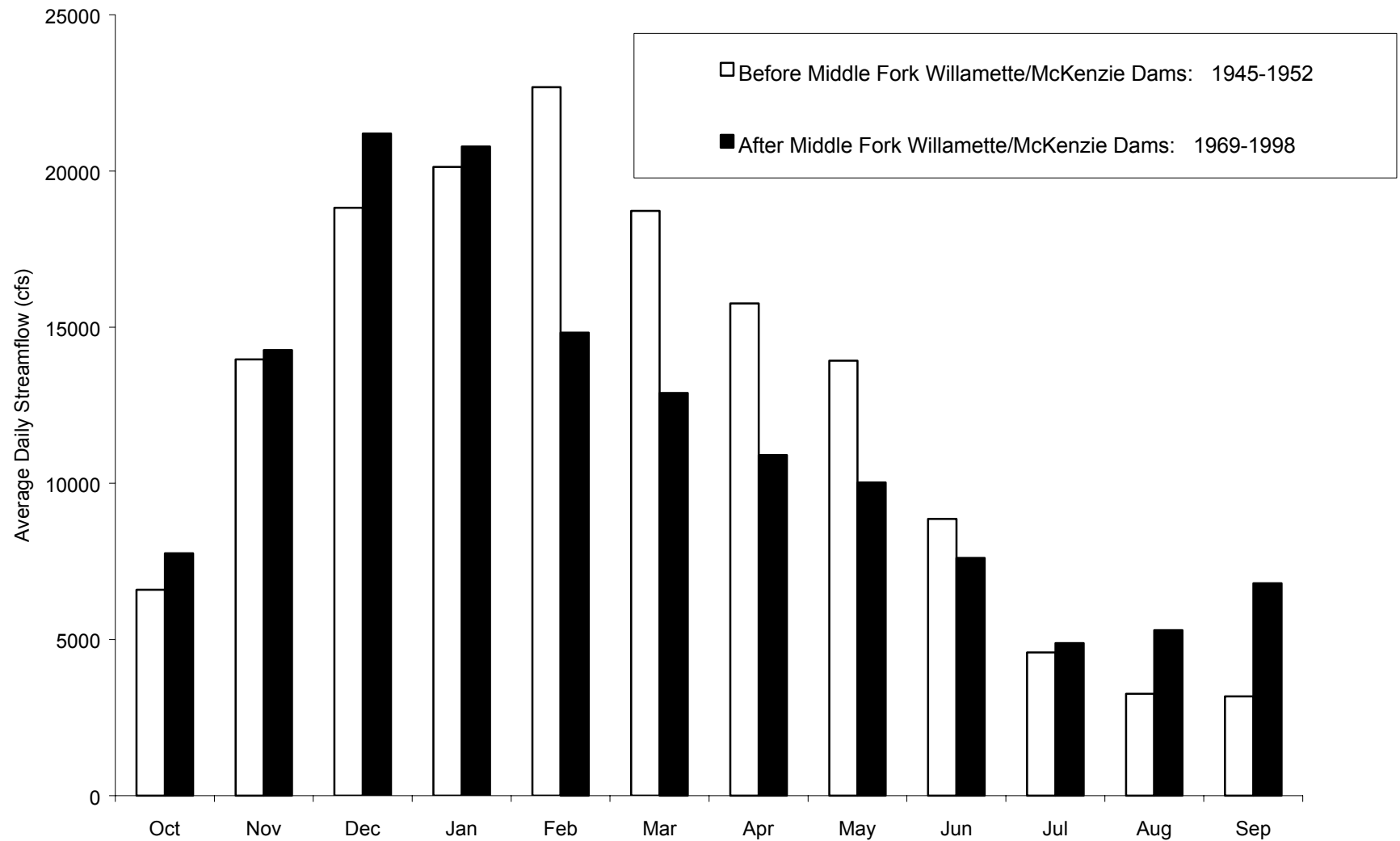


Figure F-60. Monthly Average Flows: USGS Gage: 14166000 Willamette River at Harrisburg, Oregon, below the McKenzie River. Note: Dorena Dam was constructed in 1949, but assumed to have negligible effect on before-dam values.

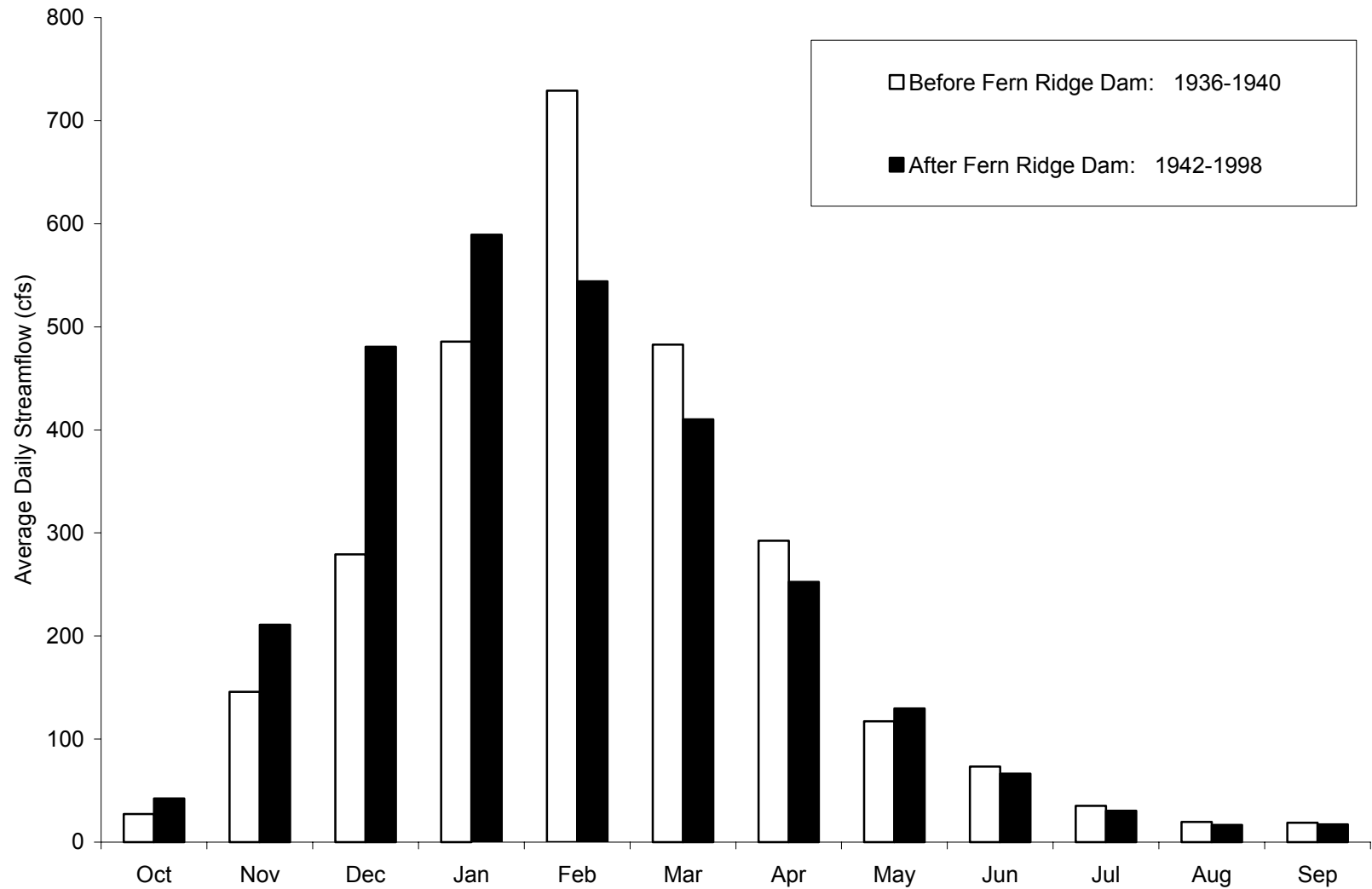


Figure F-61. Monthly Average Flows: USGS Gage: 14166500 Long Tom River near Noti, Oregon, above Fern Ridge Reservoir.

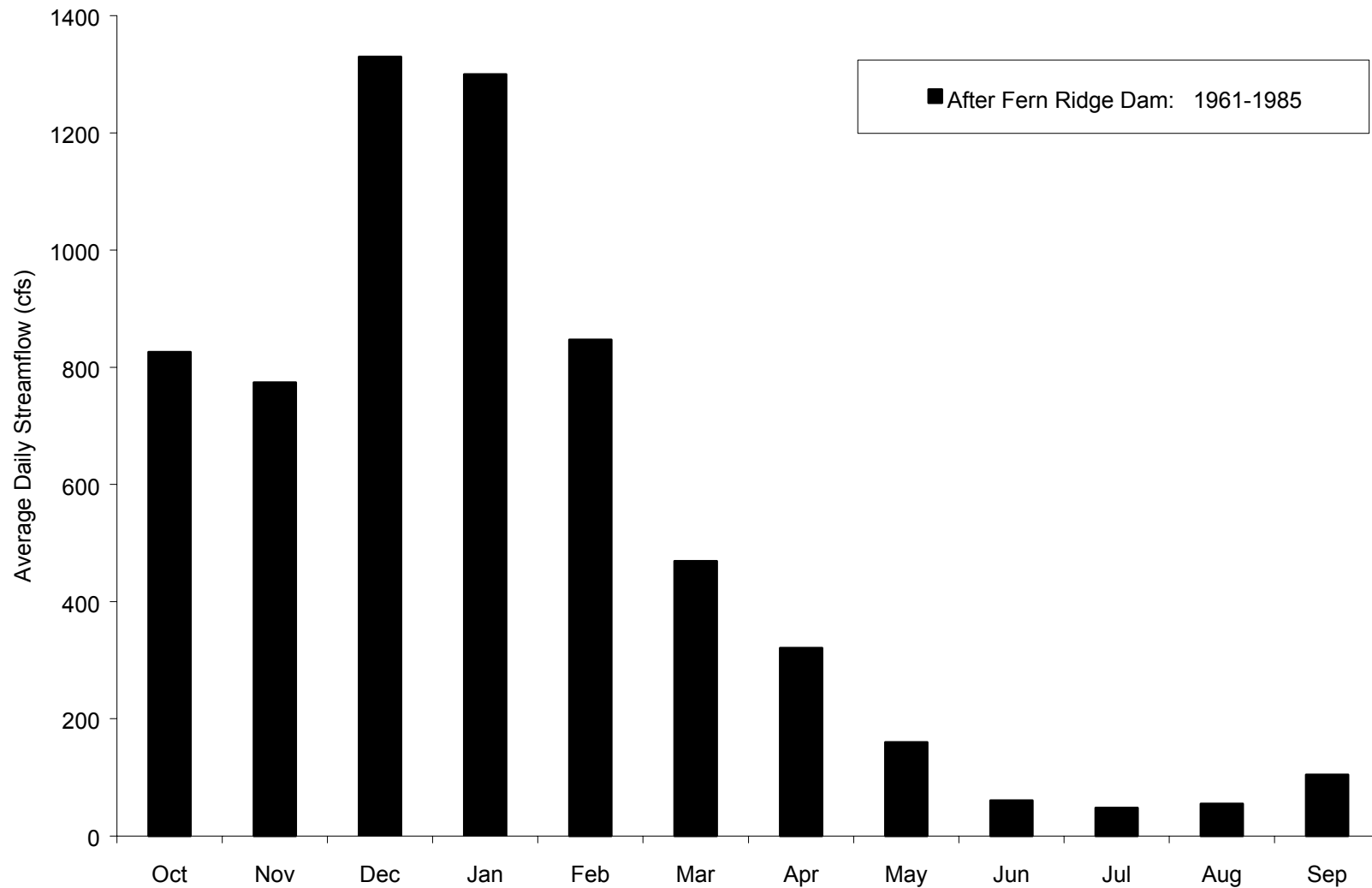


Figure F-62. Monthly Average Flows: USGS Gage: 14169001 Long Tom River near Alvadore, Oregon, below Fern Ridge Dam.

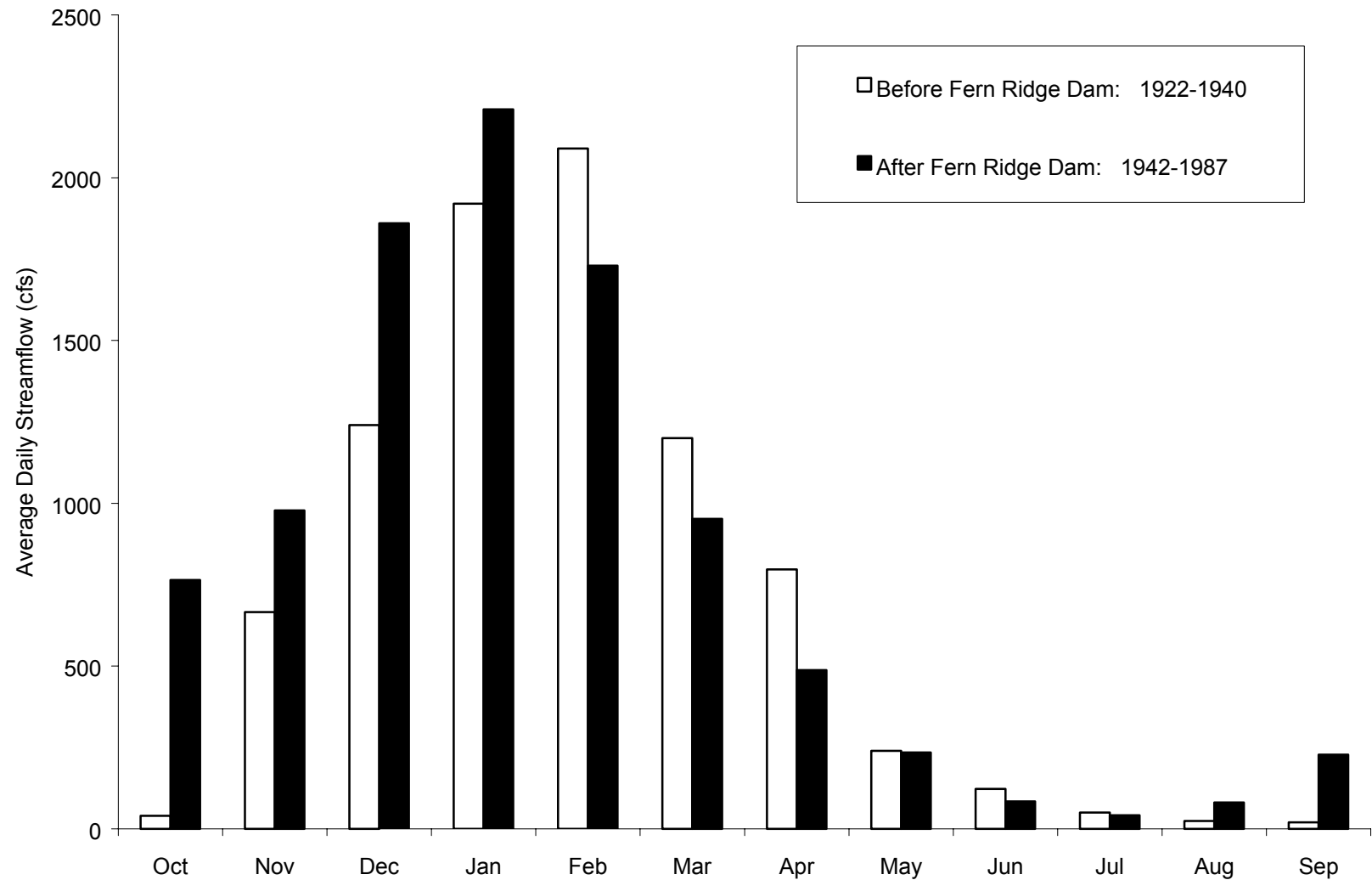


Figure F-63. Monthly Average Flows: USGS Gage: 14170000 Long Tom River at Monroe, Oregon, near mouth.

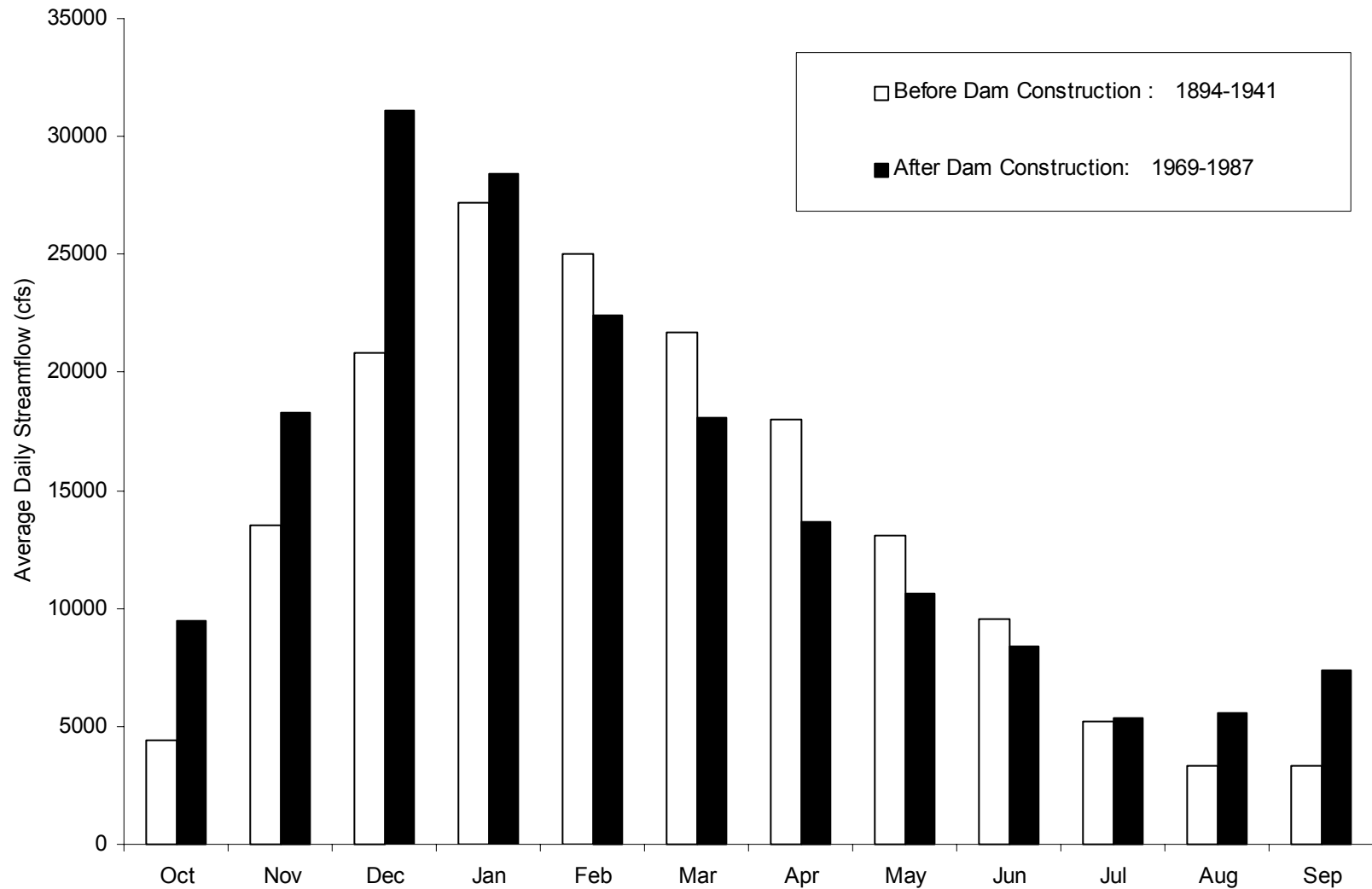


Figure F-64. Monthly Average Flows: USGS Gage: 14174000 Willamette River at Albany, Oregon, upstream of the Santiam River.

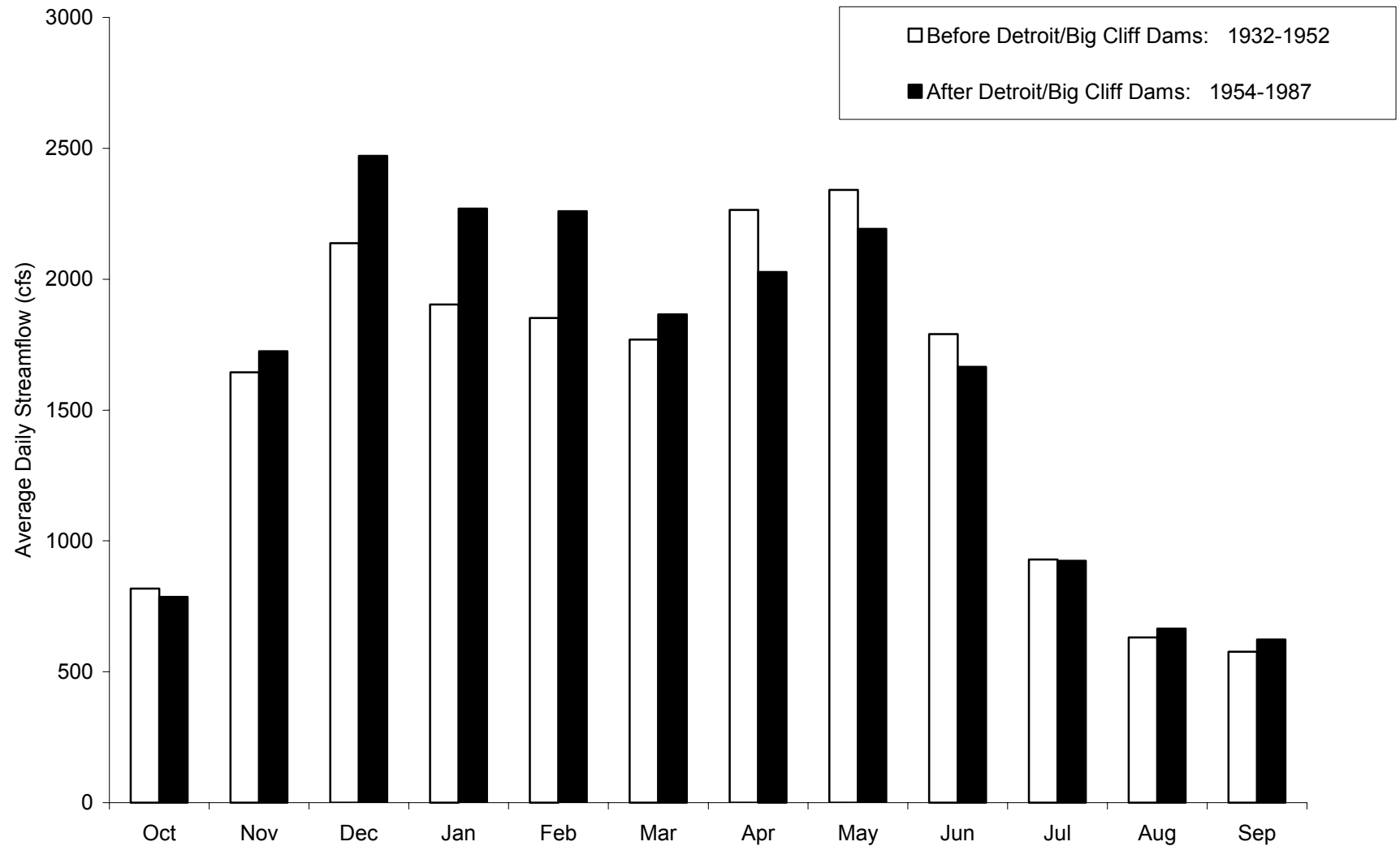


Figure F-65. Monthly Average Combined Flows: USGS Gage: 14178000 North Santiam River below Boulder Creek, near Detroit, Oregon and USGS Gage: 14179000 Breitenbush River above French Creek, near Detroit, Oregon.

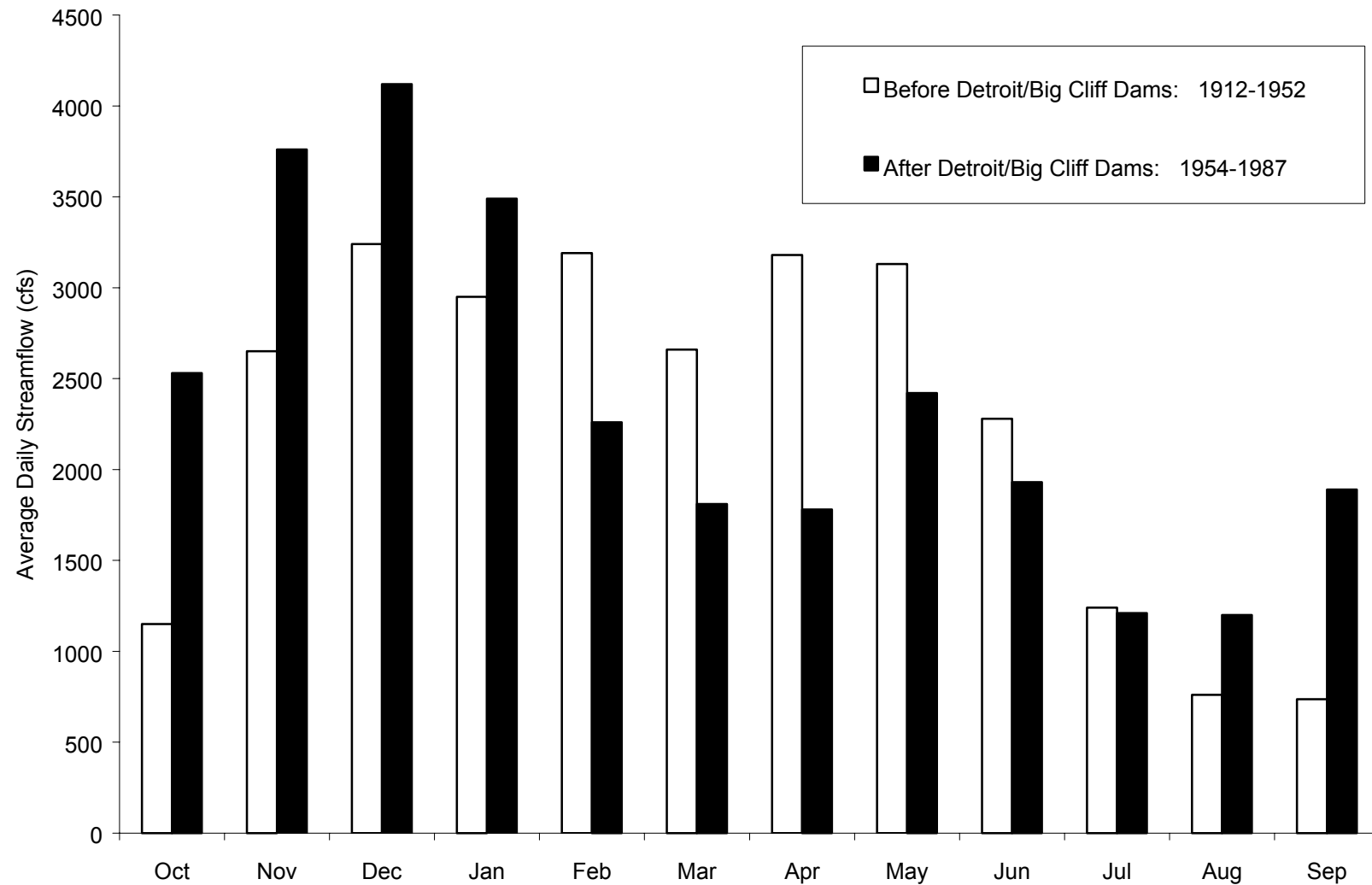


Figure F-66. Monthly Average Flows: USGS Gage: 14181500 North Santiam River at Niagara, Oregon, below Big Cliff Dam.

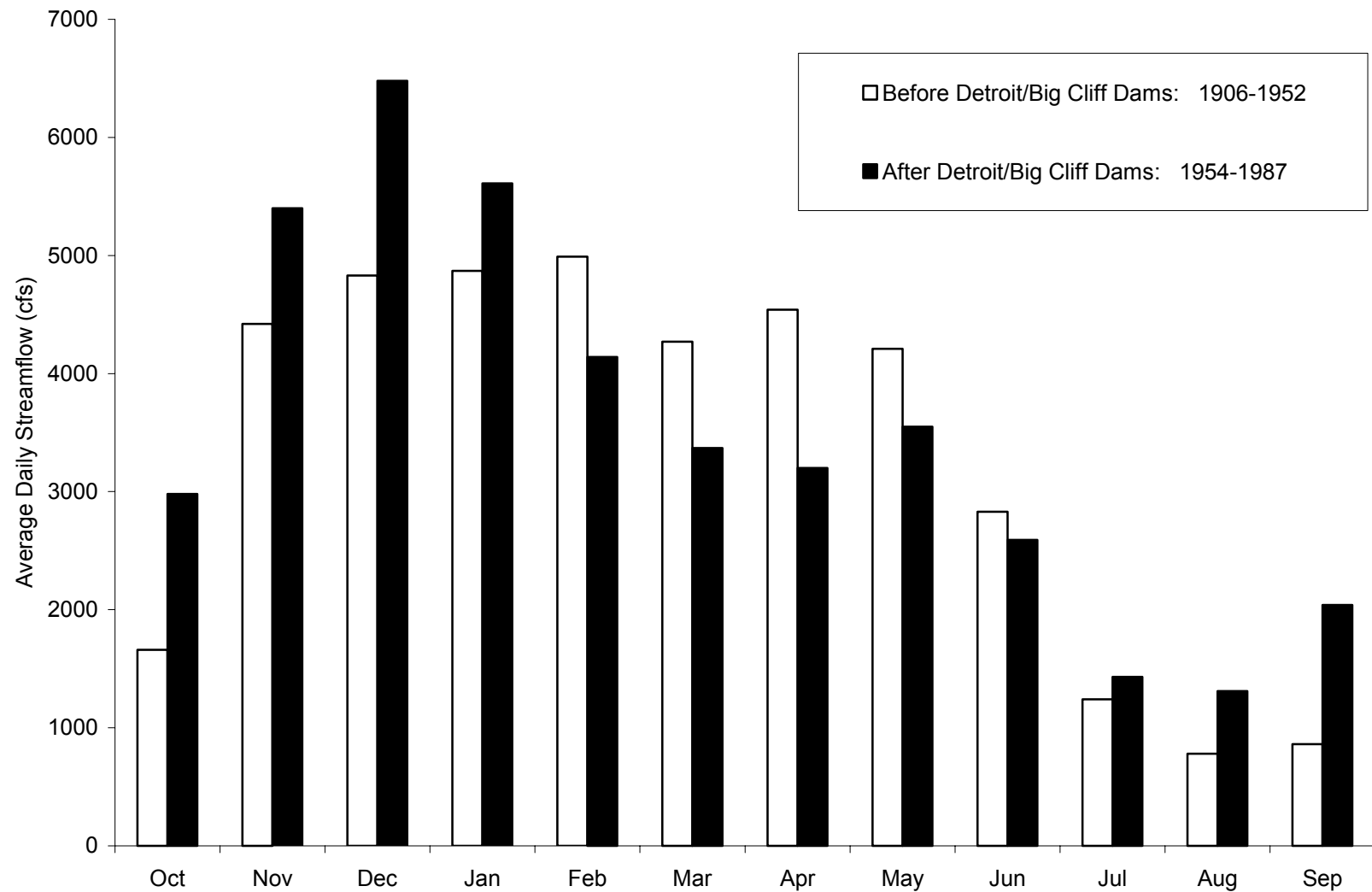


Figure F-67. Monthly Average Flows: USGS Gage: 14183000 North Santiam River at Mehama, Oregon, below Little North Santiam River.

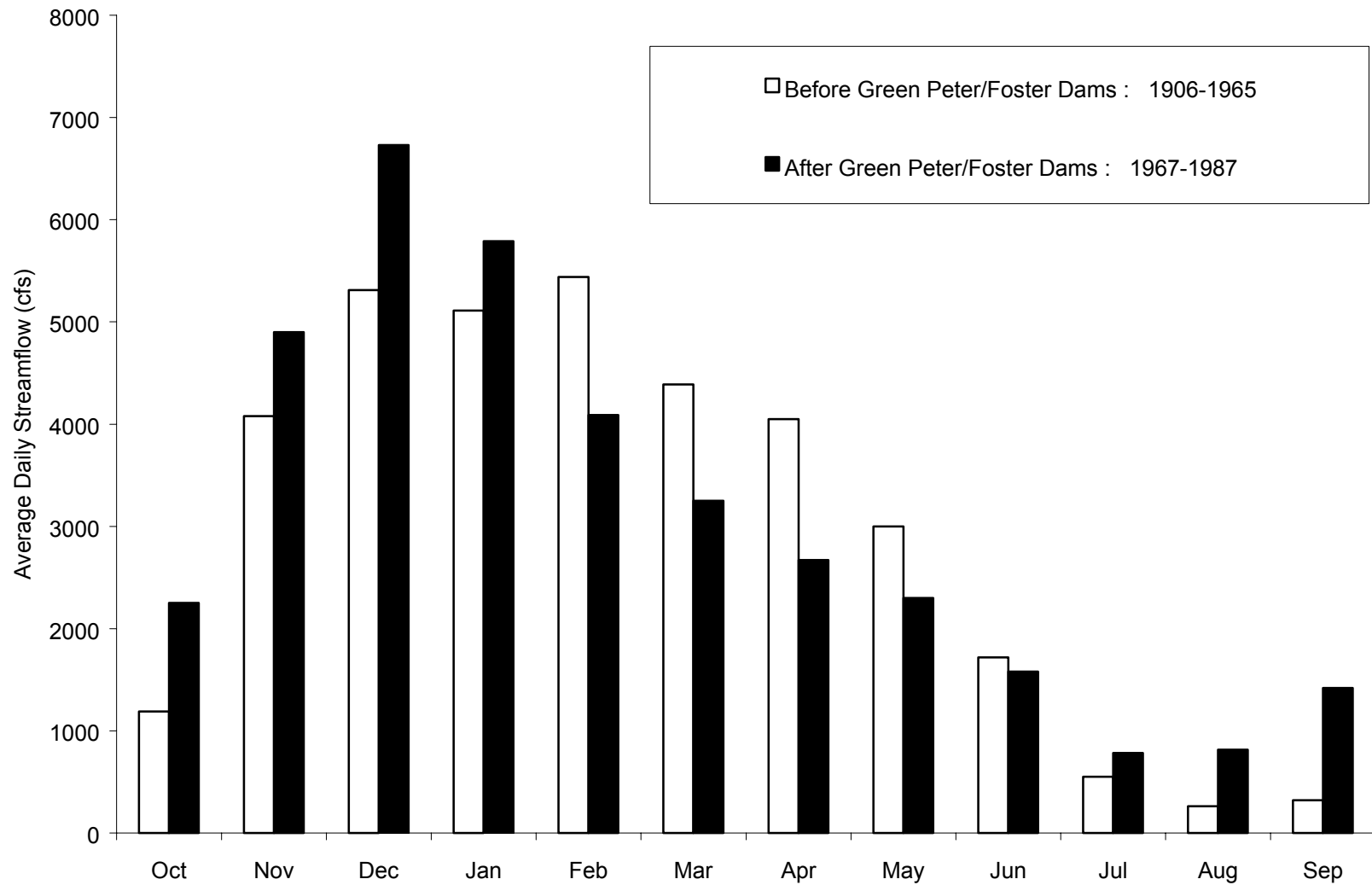


Figure F-68. Monthly Average Flows: USGS Gage: 14187500 South Santiam River at Waterloo, Oregon, below Foster Dam.

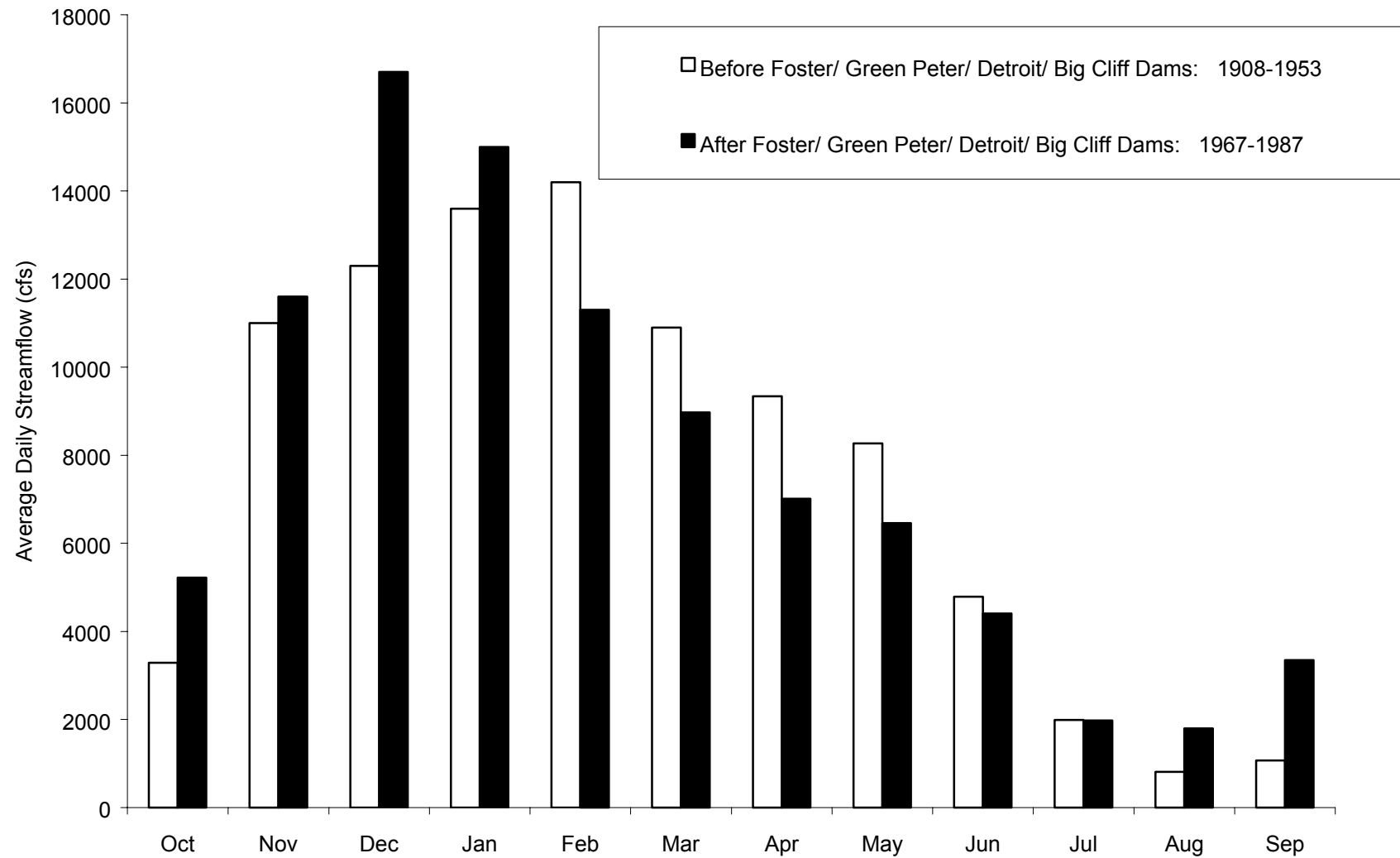


Figure F-69. Monthly Average Flows: USGS Gage: 14189000 Santiam River at Jefferson, Oregon.

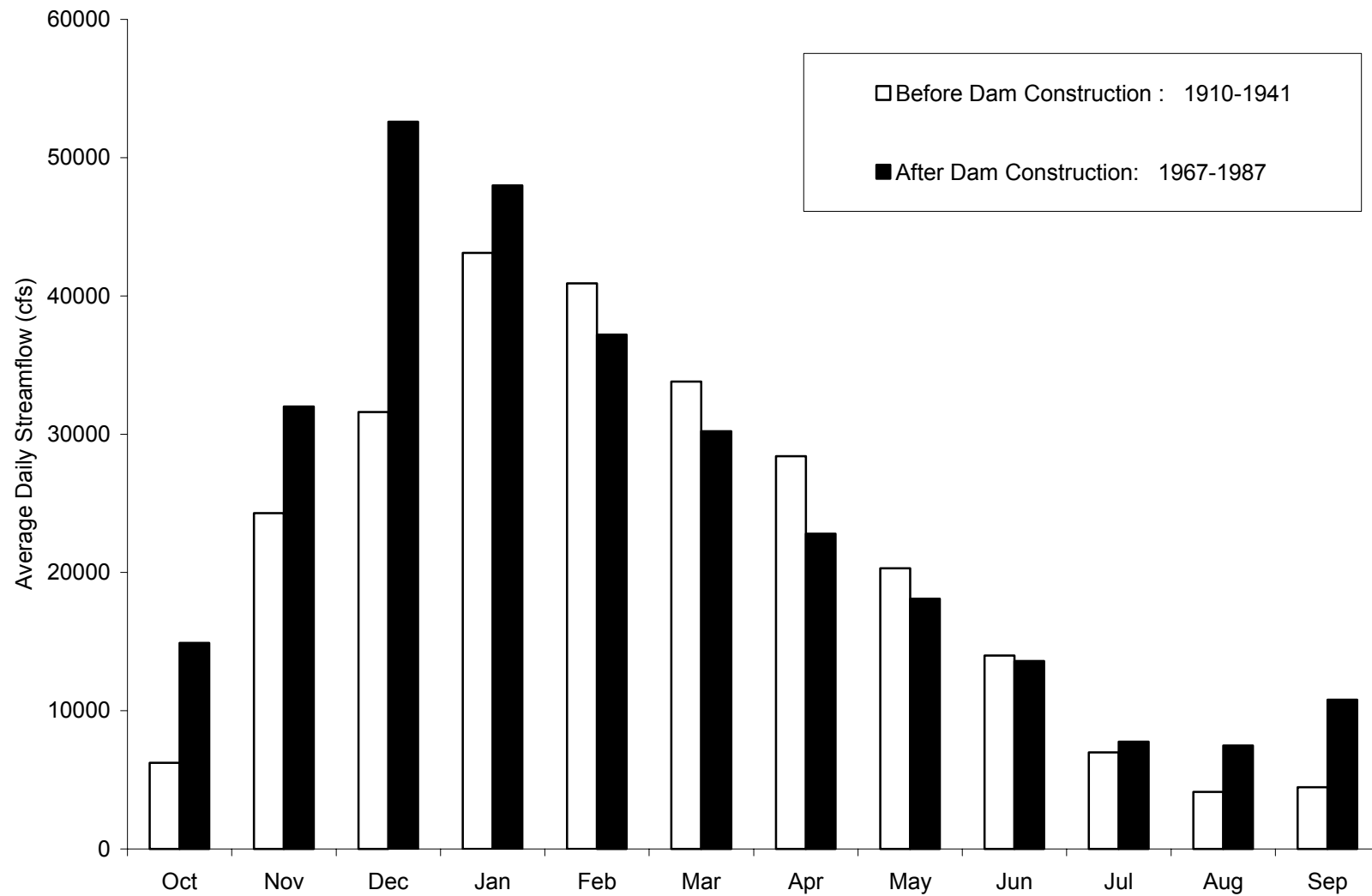


Figure D-70. Monthly Average Flows: USGS Gage: 14191000 Willamette River at Salem, Oregon, below Santiam River.